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A COLLECTION OF BIRDS FROM NORTHERN GUANACASTE
COSTA RICA

By ALEXANDER WETMORE

IN THE fall of 1940, when opportunity came for me to visit Costa Rica and to study the birds of the northwestern Province of that country, a plan of many years' standing was fulfilled. The U. S. National Museum, as a result of the early work of Juan Cooper, William Gabb, Anastasio Alfaro, and José Zeledón, and the assistance of the last named to Robert Ridgway, had received many specimens of birds from the Republic, but among the numerous localities from which these came the Province of Guanacaste was almost wholly unrepresented. Only a few specimens, received by gift or in exchange, had come from that area. As my time was limited it was necessary for me to concentrate on one area in the northern part of the Province. Here my investigations centered on the capital town Liberia and extended inland to the Volcán Rincón de la Vieja.

In the arrangements for these studies, and during my most pleasant stay in Costa Rica, I was indebted to many friends. On my arrival I was received with every courtesy as the guest of the Government, and I have the happiest of memories of all those with whom I had association. Among these I must mention especially Licenciado Don Luis Demetrio Tinoco, Ministro de Educación, and Licenciado Don Alberto Echandi, Ministro de Relaciones Exteriores. My friend Dr. Juvenal Valerio Rodríguez, then Director of the Museo Nacional in San José, met me on my arrival in Puerto Limón and assisted me in every way throughout the period of my work. To Señor Don Juan Muñoz, Governor of the Province of Guanacaste, and to General

Gregorio Aguilar Sibaja, Comandante de la Plaza in Liberia, I wish to express my sincere appreciation for their courtesy and assistance in furthering my studies in the field. In San José, Modesto Martínez was most kind to me. Carlos Aguilar, at that time in charge of the zoological collections in the Museo Nacional, worked as my assistant during the entire period of my stay in Guanacaste. One of the pleasant memories of my travels in Latin America is my stay in Liberia and at the hospitable Hacienda Santa María. Always was I among companions who were interested in helping me and in making me feel completely at home in their attractive and friendly land.

ITINERARY

Early in the morning of October 12, 1940, I landed in Puerto Limón from the United Fruit Co.'s steamship *Jamaica*, where through the courtesy of the government officials the formalities of entry into the country were quickly completed, and I was greeted in courteous and friendly fashion as the guest of the Government of Costa Rica. Accompanied by Dr. Juvenal Valerio Rodríguez, Director of the Museo Nacional, who had come to meet me, and with other officials who had arrived on the same ship, I boarded a special train which carried us up the beautiful valley of the Río Reventazón to the highlands of the Meseta Central, and finally to the capital city of San José. A week here passed rapidly and pleasantly, occupied in meeting scientists of the country, in visits to government offices, and in work at the Museo Nacional on its interesting and valuable collections. On October 16, in company with Rómulo Valerio Rodríguez and Alfonso Segura Paguaga, I went in a car furnished by the government to San Ramón, continuing from there to examine a vertebrate fossil deposit located along the Quebrada Ramírez on the Finca Piedades of Don Gabriel Barrantes.

On the morning of October 19, in company with Dr. Valerio and Carlos Aguilar of the Museo Nacional, I left San José, by Taca plane for Guanacaste. At the take-off the wind was blowing and the air was cold, but a half hour later we came down into the long, narrow landing field at Puntarenas on the Gulf of Nicoya into true tropical heat. Beyond, after a half-hour pause, the plane traveled high above mangrove swamps bordering the gulf to the mouth of the Río Tempisque, crossed the wide delta of that river, and continued over the Nicoya Peninsula. Here sharp ridges covered with scrub and low forest rose a thousand feet or more, with small, level valleys lying between.

After a brief stop in Santa Cruz we returned to the southeast over hilly country to Nicoya and then continued north again above the town of Filadelfia to Paso Tempisque. As at the two previous stops, the airfield was long, rather narrow, and grown with grass, with

a small structure at one end consisting of a sheet-iron roof supported on posts and a square, locked room built under one corner. A group of saddle horses crowded in the shade behind the building while the riders walked out to the plane.

This was on the valley floor of the Río Tempisque where it was hot in spite of the early hour. From the air I had an excellent view of the winding course of the river bordered with trees, and of the lowlands adjacent, which were marshy in places. Occasional white herons appeared, and once a little flock of jaçanas. Inland we passed a rather abrupt escarpment that bounded a plain extending toward the distant mountains, and almost immediately I saw the town of Liberia, capital of Guanacaste. About the town the land appeared rather level, with an open growth of brush and trees. Far to the west I could see the Pacific Ocean, while to the east, nearer at hand, rose the mountains, with Volcán Rincón de la Vieja nearby and Volcán Miravalles directly east but at a greater distance.

The airport, reached at half past 9, was at the edge of town and was larger than the others seen. Truly, air travel has been a wonderful service for this region, accessible otherwise only by slow overland journeys requiring several days.

Guanacaste is a land completely apart from the elevated, thickly populated tableland of central Costa Rica. Roads are primitive, so that travel for a good part of the year is by oxcart and horse. Only during the dry season are the carreteras passable for trucks, and only then through skillful driving. The land in the main is held in great haciendas, with cattle raising as the principal industry. Along the valley of the Río Tempisque, and in limited areas elsewhere, as near Liberia, there are small farms where corn, rice, and beans are grown. Over vast sections one sees only scrub forest and pastureland traversed by cattle trails, with houses at long intervals.

In Liberia, known as the Ciudad Blanca because of the white sand of its streets and its white-walled houses, Dr. Valerio left me, and with Aguilar I began at once field studies of the bird life of the region.

The Río Liberia (pl. 5, fig. 1), which passes through the edge of town, is here narrow and rather swift, with clear water. A forest of fair-sized trees lined its banks below town, with occasional stands of larger growth. Also I found open country with small lakes and ponds. Away from the stream the land was cultivated in places, and elsewhere was in pastures (pl. 3, fig. 1) dotted with groves or stands of rather dense scrub. Small quebradas with fairly level, sandy or stony bottoms draining into the river were common. To the east the river ran between hills, forested for a short distance, and then barren and dry, dotted with stunted oaks, and covered with sparse grass, an arid, almost desert region, where birds and other forms of life were rare.

Five miles to the northwest the Río Colorado (pl. 3, fig. 2) joined with the Río Blanco to form a larger stream than the Liberia that dropped rapidly over a stony bed, with quieter stretches at intervals in which we swam to refresh our bodies from the heat. Here there were forested areas and pastures as at Liberia (pl. 4, fig. 1).

The elevation at the airport was 96 meters above sea level. The end of the rainy season was near and many days were continuously clear. Storms came mainly in afternoon and at night, and only occasionally was the morning cloudy. In early morning as the sun rose the air was delightfully cool, but on most days before noon heat drove the birds to cover. Usually there was a breeze in the afternoon, but at this season the frequent rains kept down the dust that later I was told blew in clouds across the land.

On November 4, by invitation of Bert De Langton, Aguilar and I rode inland to the Hacienda Santa María located on the southern and southwestern slopes of the Volcán Rincón de la Vieja (pl. 4, fig. 2). The trail, after crossing the Río Liberia, led over dry-soiled, rolling ridges covered with low, scrubby trees. Deeper valleys carried branches of the river bordered by forest. The region was one without human habitation. Presently, as the elevation increased, some of the ridges carried more vegetation, and beyond the land was covered with grass, in places 2 or 3 feet high, interspersed with thickets and groves of good-sized trees. We continued past a deserted estancia house called Las Delicias and found at this increased elevation that the air had become cool and invigorating. Finally we reached a high, open slope and saw the hacienda house located a mile away across rolling pastures at the edge of the mountain forest (pl. 6, fig. 2). The property had been acquired only recently by Mr. De Langton, and for several years no stock had been run here except for the few head used by the caretaker. In consequence grass grew waist high in places, and there were few open trails away from the house. Deer, peccaries, and other game abounded; we saw fresh jaguar tracks daily; there were occasional signs of mountain lions; and tapirs and interesting birds were common.

The main cone of Rincón de la Vieja appeared bare in the main, and I was told that there were openings where gases and steam escaped. From the main mountain there extended to the southeast the Cerro Santa María (pl. 4, fig. 2; pl. 6, fig. 1) covered with heavy forest that grew down to the hacienda house at an elevation of 750 meters. Above a small coffee plantation back of the house there was a steep pitch over a shoulder of the mountain that led to a high heavily wooded flat known as Papal at 900 meters. Beyond this a series of ridges led up the mountain to the summit of the Cerro, which I estimated to be about 975 meters in elevation. The entire



1. Guanacaste trees in pasturelands near Liberia, Costa Rica. October 19, 1940.



2. Río Colorado, northwest of Liberia, Costa Rica. October 20, 1940.



1. Near the Río Colorado, northwest of Liberia, Costa Rica. October 20, 1940.



2. The Volcán Rincón de la Vieja from the airport at Liberia, Costa Rica, the barren volcano being the highest point, with the wooded Cerro Santa María adjacent at the right October 21, 1940.



1. The Río Liberia below Liberia, Costa Rica. October 22, 1940.



2. Open grassland on the southern base of the slopes of Volcán Rincón de la Vieja.
November 4, 1940.



1. Looking across pasturelands to the forested slopes of Cerro Santa María. November 6 1940.



2. The Hacienda Santa María, with the wooded slopes above obscured by mist. November 16, 1940.

mountain was heavily forested so that I marked the old, obscure trail along the ridges, making it possible to work in here without difficulty on days when the mountain slopes were hidden in fog and mist.

From the house a reasonably good trail led around to the east to a broad, fairly level area known as Los Cuadros, where there were old plantations and overgrown clearings in a fine forest in which the larger trees rose to a height of 60 meters. Below the forest the land was rolling, with the ridges and slopes in pasture (pl. 5, fig. 2), while depressions and gullies were filled with brush and stands of oaks and other trees. This was excellent bird country, but a little lower down, where the forest was again continuous for some distance, there was a dense undergrowth of bamboo that was silent and lifeless and extremely difficult to penetrate. The head of the Río Liberia swings into a deep, wooded valley at the north of the house, with tributaries of clear water flowing toward it at frequent intervals. Los Cuadros marked the divide with the Caribbean slope, and here water ran toward the east. When I climbed to open slopes on the mountain shoulders that from below appeared covered with smooth turf I found often that they were waist high in dense grass and tough bushes and almost impassable. In the forest there was necessity for much use of the machete. The undergrowth was always wet and the slopes often slippery.

The bird life here was interesting and abundant, and after long trips afield it was most agreeable to work at the hacienda in the cool, pleasant afternoons, with macaws flying about, a house wren singing, and howler monkeys roaring in the distance. Don Fernando Siles, manager of the hacienda, and his wife were most kind to me in every way, and it was with definite regret that on November 16 I saw my outfit loaded on pack mules for the journey back to Liberia. I had 2 more days in the field here, and then on November 19 Aguilar and I returned by plane to San José. On November 23, accompanied by Dr. Valerio and Aguilar, I descended again by rail to Puerto Limón, to sail at 6 in the evening on the United Fruit Line steamer *Veragua*.

LIFE ZONES AND DISTRIBUTION

Since the period of work in Guanacaste was short, my investigations were in the nature of a reconnaissance that permitted only partial view of the region. I have therefore restricted the extent of the present discussion of distributional data. The area about Liberia lies in the arid division of the Lower Tropical Zone, this extending inland over the lower slopes of the mountain through the area draining into the Pacific. Birds were common here and in good variety, though the species are definitely fewer than in corresponding areas

in the humid section bordering the Gulf of Mexico. The region was marked by areas of scrub, open or dense, by pasturelands broken by thickets and groves, and by tracts of forest along the streams and in poorly drained areas. Below Liberia there were scattered marshes and shallow lagoons. Whether part of the pasturelands had originally been in savanna it was difficult to say, but there were extensive savanna areas toward the mountains.

It is hardly proper to attempt to list completely the characteristic birds of the arid Lower Tropical Zone from the small amount of field work on which this report is based. Instead I shall point out some of the interesting facts in distribution that have been evident.

As characteristic birds of the arid division I may mention such forms as *Scardafella inca*, *Eumomota superciliosa australis*, *Myiarchus nuttingi nuttingi*, *Camptostoma imberbe*, *Polioptila plumbea bairdi*, *Icterus sclateri sclateri*, and *Aimophila rufescens hypaethrus*. It was curious that near Liberia I found no species of the family Formicariidae; though I was certain that some form of *Thamnophilus* must occur, apparently it is found in very limited numbers.

At the Hacienda Santa María on the lower slopes of the Cerro Santa María there was rather abrupt transition to the humid Lower Tropical Zone in the great forests that extended over the mountain and reached to the east over the broad, fairly level area at Los Cuadros. As remarked above, this was the watershed between the Atlantic and the Pacific drainages. Here I obtained *Xiphorhynchus triangularis punctigulus*, *Sclerurus albigularis canigularis*, *Phaenostictus mcleannani saturatus*, *Lophotriccus pileatus luteiventris*, and *Lanio leucothorax leucothorax*.

In two instances I secured different forms of the same species at Liberia and on the Cerro Santa María. In the arid division I obtained *Piaya cayana stirtoni* and *Hylophilus decurtatus pallidus*, while in the humid Lower Tropical area I found *P. c. thermophila* and *H. d. decurtatus*.

As one travels across the rather barren area of poor soil with low, scrubby oaks and scattered herbaceous vegetation toward the mountains the land rises, and there is a sudden transition at about 300 meters elevation to a greener, more fertile region, beginning a short distance below the old, outlying ranch house at Las Delicias. The open slopes in November 1940 were covered with an abundance of green grass, and in the heavier woodland there appeared a dense undergrowth of a small bamboo. Above, the slopes were more open, covered with excellent pasturage, groves being found mainly in the hollows. The growth here was influenced by the rains, mists, and fogs that sweep across from the Atlantic side, and the area nearer the Hacienda Santa María must be considered a part of the humid section

of the zone. The handsome, crested magpie-jay (*Calocitta formosa pompata*) of the arid section, however, ranged across the open lands to the wooded area, occurring thus at the very head of the Caribbean drainage. In these upland savannas I found the grasshopper sparrow and also the meadowlark.

In the heavy forests above 1,000 meters on the Cerro Santa María there was weak indication among the birds of humid Upper Tropical Zone elements, the belt often termed the Subtropical Zone. Trees were tall, and at 1,200 meters I found tree ferns. The toucanet *Aulacorhynchus caeruleogularis* lived here, descending to feed as low as the coffee plantation back of the hacienda, but belonging properly in the higher mountain forests. Other species indicative of the higher zone elements are *Rhynchocyclus brevirostris brevirostris*, *Turdus plebejus plebejus*, and *Catharus mexicanus fumosus*. The race of *Myioborus miniatus* found here, and also *Basileuterus culicivorus culicivorus*, *Henicorhina leucosticta tropaea*, and *Xenops minutus ridgwayi*, are less certainly characteristic of the higher zone since they range also into the upper portions of the Lower Tropical Zone. The summit of the mountain usually was covered with clouds that hung in the tree tops, leaving the undergrowth below free, and was beset with winds that seemed cold and harsh, partly because in work in these higher regions my clothing was always soaked with water from the dripping leaves and branches. Birds were more abundant on the lower parts of the forested slopes than in the wet undergrowth across the summit.

I did not reach the somewhat higher reaches of the main peak of Volcán Rincón de la Vieja, but from the views that I had of the west face the slopes were not forested, being covered with grass and herbaceous vegetation, with indication of brush. Possibly this western face may belong in the arid division of the Upper Tropical Zone, but this was not certain.

NOTES ON MIGRATION

The valley of the Río Tempisque and its tributaries seems to form one of the definite highways for northern migrants that travel to and through southern Central America. My stay was during the time of the fall migration, when migrants of a number of species were passing regularly, while others seemed more or less settled on their winter range. Among these travelers from the north sharp-shinned, broad-winged, marsh, and sparrow hawks were found in small numbers. Spotted sandpipers ranged along the Río Liberia, the lesser yellowlegs appeared casually, and in the uplands I saw one Wilson's snipe. A killdeer frequented the horse corral at the Hacienda Santa María.

The western mourning dove appeared on October 27, and on November 1 fully 100 were seen near the Río Colorado. The Texas

nighthawk was recorded in Liberia on October 22 and was seen daily over the Plaza and the pastures adjacent to town until my departure. The ruby-throated hummingbird was common in certain areas. Among the flycatchers it was interesting to find the northern and southern races of the crested flycatcher in the same region and to obtain the yellow-bellied flycatcher. The wood pewees were still more intriguing, and at Liberia I shot specimens of the eastern, western, and Mexican forms, ranging together and not to be distinguished except in the hand. The scissor-tailed flycatcher appeared on October 24 and was found at times in flocks. In evening many came from the open country to sleep in the shade trees of Liberia.

The barn swallow was another common species in the open areas, often in flocks. Bullock's and Baltimore orioles were found together. In the woods and groves I collected yellow-throated and Philadelphia vireos and a fair variety of northern wood warblers, as well as the eastern summer tanager, the rose-breasted grosbeak, and the indigo and western painted buntings.

ANNOTATED LIST OF BIRDS

Family FREGATIDAE

FREGATA MAGNIFICENS Mathews: Man-o'-war-bird

Fregata minor magnificens MATHEWS, Austr. Avian Rec., vol. 2, 1914, p. 120 (Barrington Island, Galápagos Islands).

On October 18 I saw several man-o'-war-birds soaring over the harbor at Puntarenas.

Family ARDEIDAE

ARDEA HERODIAS Linnaeus: Great Blue Heron

Ardea Herodias LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 143 (Hudson Bay).

On November 2 I saw one great blue heron at the lagoon on the Finca América, below Liberia.

CASMERODIUS ALBUS EGRETTE (Gmelin): American Egret

Ardea Egretta GMELIN, Systema naturae, vol. 1, pt. 2, 1789, p. 629 (Cayenne).

These herons were found at lagoons near Liberia on October 30 and 31 and November 2.

FLORIDA CAERULEA (Linnaeus): Little Blue Heron

Ardea caerulea LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 143 (South Carolina).

The little blue heron was recorded near Liberia, October 31 and November 18.

BUTORIDES VIRESCENS (Linnaeus)

Ardea virescens LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 144 (South Carolina).

Green herons were seen near Liberia on October 21 and 31, but were not taken.

Family ANATIDAE

DENDROCYGNA AUTUMNALIS (Linnaeus)

Anas autumnalis LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 127 (America).

On November 1 I flushed two of these tree-ducks from a wet meadow at the Río Colorado northwest of Liberia.

CAIRINA MOSCHATA (Linnaeus)

Anas moschata LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 124 (Brazil).

Below Liberia on November 2 a dozen of these ducks rose from a small lagoon near the Finca America. About 2 o'clock in the morning of November 18, during a full moon, I was aroused from sleep by the calls of a flock that circled over the village.

Family CATHARTIDAE

CORAGYPS ATRATUS (Meyer)

Vultur atratus MEYER, Zool. Annal., vol. 1, 1794, p. 290 (St. Johns River, Fla.).

The black vulture was a common species, seen usually about houses. I observed them often also soaring high in the air. At Liberia one came occasionally into the patio of the house where I lived, searching for scraps of meat. There was always a flock near the village slaughterhouse. One day as I watched a group gathered at carrion I heard several uttering hissing, growling calls, such as I have recorded occasionally elsewhere. There was no question that these were adult birds. This species differs decidedly in this matter of voice from the turkey vulture, which is vocal when immature but when adult is mute, except for the hissing of air expelled from its body when excited.

At the Hacienda Santa María there was a flock of 30 or 40 around the corral, and individuals were seen regularly soaring over the pastures. They never entered the uninhabited, forested area.

CATHARTES AURA (Linnaeus)

Vultur Aura LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 86 (Vera Cruz, Veraacruz, México).

The turkey vulture was a bird of daily record both at Liberia and on the Hacienda Santa María, and it ranged even through the semi-desert area above Liberia toward the mountains. On October 28 I

saw one immature bird with dark head but fully grown. In the mountains one or two were constantly in sight over the meadows.

Family ACCIPITRIDAE

ACCIPITER STRIATUS VELOX (Wilson): Sharp-shinned Hawk

Falco velox WILSON, American ornithology, vol. 5, 1812, p. 116, pl. 45, fig. 1 (Philadelphia, Pa.).

A female sharp-shin was taken near Liberia on October 28, and another bird was seen at the Hacienda Santa María on November 8. Carriker in his "Birds of Costa Rica" records it only from the plateau region.

BUTEO PLATYPTERUS PLATYPTERUS (Vieillot): Broad-winged Hawk

Sparvius platypterus VIEILLOT, Tableau Encycl. Méth., vol. 3, 1823, p. 1273 (Philadelphia, Pa.).

Near Liberia on October 24 I shot a male and saw another of these hawks on November 18. At the Hacienda Santa María I killed one on November 12 and gave it to Aguilar. The birds were found at the edge of forest and were quite fat.

BUTEO MAGNIROSTRIS ARGUTUS (Peters and Griscom)

Rupornis magnirostris arguta PETERS and GRISCOM, Proc. New England Zoöl. Club, vol. 11, Aug. 30, 1929, p. 46 (Almirante, Panamá).

These small hawks were common near Liberia where I prepared a male as a specimen on October 19. On the Hacienda Santa María they were found through the groves bordering the pastures and along the edge of the forest. The species is one that does not range in heavily forested areas. As always, these birds were tame, coming quickly to me at any imitation of a wounded or excited bird and calling querulously as I passed through their haunts. The specimen taken is from near the northern limits of this race in northwestern Costa Rica.

BUTEO NITIDA MICRUS (Miller and Griscom)

Asturina nitida micrus MILLER and GRISCOM, Amer. Mus. Nov., No. 25, Dec. 9, 1921, p. 4 (4 miles northeast of Chinandega, Nicaragua).

On October 19 along the Río Liberia below Liberia one of these hawks came dashing in as I imitated the cry of a small bird in pain and alighted a few feet overhead, sending an iguana that had been resting there scurrying through the branches to a more secure spot. Another was seen here on October 22. The specimen taken, a female, has the wing 264 mm., agreeing in size and color with *micrus* from farther north and showing no approach to the smaller *B. n. costaricensis* of southwestern Costa Rica.

There is no apparent reason to dispute van Rossem's statement¹ that these hawks, known usually as *Asturina*, cannot be separated from *Buteo*.

CIRCUS CYANEUS HUDSONIUS (Linnaeus): Marsh Hawk

Falco hudsonius LINNAEUS, Systema naturae, ed. 12, vol. 1, 1766, p. 128 (Hudson Bay).

The marsh hawk was fairly common over the open pasturelands both at Liberia and on the lower mountain slopes inland. As I watched their quartering over these hunting grounds I sometimes wondered how far they had traveled in actual miles in arriving at this far southern point. I recorded the first one on October 30 at Liberia, and saw others there November 3 and 16. At the Hacienda Santa María I noted single birds on November 6, 8, 12, and 13.

Family FALCONIDAE

POLYBORUS CHERIWAY AUDUBONII Cassin

Polyborus Audubonii CASSIN, Proc. Acad. Nat. Sci. Philadelphia, Aug. 7, 1865, p. 2 (Florida).

The caracara, called locally *carga huesos*, was fairly common about Liberia, being recorded on October 18, 22, 26 and November 2.

HERPETOTHERES CACHINNANS CACHINNANS (Linnaeus)

Falco cachinnans LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 90 (Surinam).

Near Liberia these handsome hawks were noted at intervals near the river below the town, while on the Hacienda Santa María they were found occasionally where woodlands bordered open country. At times they were seen soaring overhead, when the long tail and short wings gave them a curious and very characteristic outline. More often their presence was indicated by their strange calls, exhilarating in tone to me both from the sound and from the memories that they always bring of the primitive regions where I have heard them during expeditions of other years. A female taken near Liberia, November 2, rested quietly in the top of a tree over a roadway, calling so softly that I thought at first that it was at a distance, though in reality it was directly overhead. The wing in this specimen measures 260 mm., while in color it is slightly darker above than examples from southern Mexico, being also slightly more buffy below.

This fine falcon naturally has attracted much attention as collections containing examples of it have come to hand, with the result that currently four to six subspecies have been recognized.

Since there have been some uncertainties regarding the limits of the proposed forms, I have taken advantage of opportunity to review the series in the U. S. National Museum and in the American Mu-

¹ Bull. Mus. Comp. Zoöl., vol. 77, 1934, p. 429.

scum of Natural History. In all, 84 skins have been examined, these being from localities well distributed throughout the range of the species.

Male and female in *Herpetotheres cachinnans* are alike in size and in color and marking, and individual variation, both in measurement and in coloration, is greater than has been supposed. Birds in the first year have the feathers of the dorsum and wing coverts margined with light, bright brown, but otherwise appear like adults. The number of light cross bars on the tail varies from four to five, with considerable variation in width; in some individuals the bars become divided into oval spots. The amount of dark streaking on the crown is highly variable, as is the extent of spotting on the under wing coverts. In some birds there is a deep buffy tinge in the ordinarily white markings of head and under surface, a variation which may appear anywhere in the range of the species, being intensified in regions of heavy rainfall. There is no question that during the rainy season this color may be produced or intensified by stain acquired from wet vegetation and from the ground during feeding. Conversely, birds from drier areas, or those taken during the dry season, are cleaner and therefore whiter.

Tail measurements are uncertain because of excessive wear. This is particularly the case where the birds have been feeding over burned areas, a common habit; apparently they often come down to places where the ashes are still so hot as actually to char the ends of the tail feathers.

With these facts understood the series examined may be separated into three geographic races, as outlined in the following paragraphs:

Herpetotheres cachinnans chapmani Bangs and Penard:

Herpetotheres cachinnans chapmani BANGS and PENARD, Bull. Mus. Comp. Zoöl., vol. 62, 1918, p. 37 (Santa Lucía, Río Hondo, Quintana Roo, México).

Generally similar to *H. c. cachinnans* but averaging more grayish brown above; the light margins on the dorsal feathering of the immature dress brighter, lighter brown, being brighter in color than in *queribundus*.

Range: The tropical areas of México and Guatemala, probably also British Honduras, possibly into northern Honduras and El Salvador.

Birds from northwestern México, judged from the relatively few specimens that have come from that area, have been supposed to average a little larger than from elsewhere in the north, but are equaled by individual birds from many other localities, so much that the race *excubitor*, described recently by van Rossem² cannot be separated.

² *Herpetotheres cachinnans excubitor* van Rossem, Trans. San Diego Soc. Nat. Hist., vol. 9, Nov. 21, 1938, p. 10 (Volcán de Colima, southern Jalisco).

Van Rossem gives the wing of 10 specimens of his *excubitor* from northwestern México as 280 to 302 mm., and the tail as 235 to 250 mm., and of 10 *chapmani* from eastern México and Central America as, wing 255 to 275 mm. and tail 200 to 230 mm. In material that I have examined these figures do not hold. For example, there is one bird from Palmul, Quintana Roo, with the wing 281 and the tail 200, one from Tres Zapotes, Veracruz, with these measurements 292 and 214 mm., and one from Paso Nuevo, Veracruz, 289 and 232 mm., as well as one from Progreso, eastern Guatemala, with the wing 307 and the tail 230 mm. These are mingled in the same regions with specimens of more ordinary dimension. Difference in size definitely cannot be correlated with geographic range, as the wing in birds from Veracruz and Tabasco in eastern México varies from 255 to 292 mm., and from Yucatán and Quintana Roo from 268 to 281. There does not seem to be any particular difference therefore for birds of western México. Color differences also are variable. It appears that only one race can be recognized in México.

Herpetotheres cachinnans cachinnans (Linnaeus):

Falco cachinnans LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 90 (Surinam).

Darker, blacker above; immature with light margins on dorsal feathers darker, more chestnut-brown.

Range: From Honduras (possibly from El Salvador) south through Central America to Perú and the Amazon Valley in Brazil.

Various specimens from Honduras south to Panamá appear somewhat intermediate toward the more northern form, but on the whole birds from this area average very closely similar to a good series from Surinam.

The buffy cast of the light areas of head and breast common in this hawk is intensified in birds from the western parts of Ecuador and Colombia, but this is too inconstant to warrant recognition of a separate race *fulvescens*,³ which some have suggested recently might be extended well north into Central America. This fact has been previously indicated by Peters.⁴

I have examined two specimens of the supposed race *maestus*,⁵ proposed on the basis of paler color, but this difference appears due to the skins being cleaner than the average as they come from a drier area, so that they also must be placed with *cachinnans*.

The wing in six birds from Surinam, the type locality, varies from 258 to 279 mm. A series from the entire range in South America runs from 247 to 286 mm., and one from Central America from 256 to 294.

³ *Herpetotheres cachinnans fulvescens* Chapman, Bull. Amer. Mus. Nat. Hist., vol. 34, 1915, p. 638 (Alto Bonito, 1,500 feet, west slope of western Andes, Antioquia, Colombia).

⁴ Check-list of birds of the world, vol. 1, 1931, p. 276.

⁵ *Herpetotheres cachinnans maestus* Bangs and Noble, Auk, 1918, p. 444 (Bellavista, Perú).

In two skins from Parida Island on the Pacific coast of western Panamá one measures 276 and one 290 mm., while three from nearby Gobernador Island range from 256 to 272. The great variation in size in this bird is evident from these figures.

Herpetotheres cachinnans queribundus Bangs and Penard:

Herpetotheres cachinnans queribundus BANGS and PENARD, Bull. Mus. Comp. Zool., vol. 63, 1919, p. 23 (Pernambuco, Brazil).

Similar to *cachinnans*, but more grayish brown above; similar also to *chapmani*, but more grayish above; light areas averaging whiter, with less buff than in the other two races.

Range: Eastern Brazil and eastern Bolivia south to the Territory of Chaco and Corrientes, northern Argentina.

The southern form has the wing about as in the typical form in Brazilian examples, but in the southern part of its range averages larger. Birds from Brazil have the wing 266 to 273 mm., one from Bolivia measures 263 mm., and skins from Paraguay and Argentina vary from 289 to 299 mm. The "type" locality through the chance of the original description has been set in a region where approach to *cachinnans* begins, as I consider that larger size and paler color are the characters of this race. These have their maximum development farther south.

MICRASTUR RUFICOLLIS INTERSTES Bangs

Micrastur interstes BANGS, Auk, 1907, p. 289 (La Estrella de Cartago, Costa Rica).

On November 14 in the heavy forest of Cerro Santa María I shot a male of this hawk as it came flying in to rest on a low perch and peer about while I was trying to decoy some small birds. This individual had the tail in molt.

FALCO SPARVERIUS SPARVERIUS Linnaeus: Northern Sparrow Hawk

Falco sparverius LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 90 (South Carolina).

In open fields around Liberia, and in the pasturelands of the Hacienda Santa María, the sparrow hawk was common from October 18 until my departure. One was seen near San Ramón on October 16. From this it appears to be an early arrival from the north in fall. It is called *chameleón* by the country people. The two taken are of the typical form.

Family PHASIANIDAE

ODONTOPHORUS ERYTHROPS MELANOTIS Salvin

Odontophorus melanotis SALVIN, Proc. Zool. Soc. London, 1864 (Feb. 1865), p. 586 (Tucurrique, Costa Rica).

On my first day afield at the Hacienda Santa María in the dense forest above the house I encountered a small flock of these wood-quail

on a steep slope and shot two, one from the forest floor and another from a branch 10 feet from the ground to which it had flown. The first rolled and tumbled until it fell far below where I could not find it. The second proved to be a young bird less than half grown. I encountered a few others here subsequently in heavy forest but in the dense undergrowth did not get a shot at them.

Family CHARADRIIDAE

OXYECHUS VOCIFERUS VOCIFERUS (Linnaeus): Killdeer

Charadrius vociferus LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 150 (South Carolina).

At the Hacienda Santa María I saw a killdeer in the corral near the house on November 6 and recorded one or two subsequently on November 7, 8, 10, and 11.

Family SCOLOPACIDAE

CAPELLA DELICATA (Ord): Wilson's Snipe

Scolopax delicata ORD, in reprint of Wilson's "American Ornithology," vol. 9, 1825, p. CCXVIII (Pennsylvania).

On November 11 at the Hacienda Santa María, following a heavy rain, I flushed a Wilson's snipe in a narrow trail leading through the high grass of a pasture.

ACTITIS MACULARIA (Linnaeus): Spotted Sandpiper

Tringa macularia LINNAEUS, Systema naturae, ed. 12, vol. 1, 1766, p. 249 (Pennsylvania).

Near Liberia from October 19 to November 17 I recorded this species regularly on the Río Liberia and the Río Colorado.

TOTANUS FLAVIPES (Gmelin): Lesser Yellowlegs

Scolopax flavipes GMELIN, Systema naturae, vol. 1, pt. 2, 1789, p. 659 (New York).

One lesser yellowlegs was seen at a roadside pool near Liberia on October 20.

Family COLUMBIDAE

ZENAIIDURA MACROURA MARGINELLA (Woodhouse): Western Mourning Dove

Ectopistes marginellus WOODHOUSE, Proc. Acad. Nat. Sci. Philadelphia, vol. 6, May-June (Aug. 20), 1852, p. 104 (Cross Timbers, north fork of Canadian River, Okla.).

Near Liberia two mourning doves were seen October 27 in pasturelands south of town, and another was recorded October 30. On November 1 I found 100 or more in small flocks scattered over open meadows near the Río Colorado and shot one. Others were seen on November 2 and 3.

The specimen taken, a male, belongs to the western subspecies as indicated by the paler brown of the tertials, back, and rump, when compared with eastern birds. While many western birds are paler below also some have the breast and foreneck as dark as some of the eastern race.

ZENAIDA ASIATICA ASIATICA (Linnaeus): Eastern White-winged Dove

Columba asiatica LINNAEUS, *Systema naturae*, ed 10, vol. 1, 1758, p. 163 (Jamaica).

Near Liberia white-winged doves were found in small numbers near areas of small, cultivated fields. I shot a female here on October 31.

There is considerable variation in depth of color in birds of this species so that in the small series from Costa Rica at hand I cannot distinguish the race *australis* that Peters has described⁶ from the western part of that country. I have at hand specimens from Veracruz, México, and elsewhere that are just as dark as those from the Pacific slope of Costa Rica.

SCARDAFELLA INCA (Lesson): Inca Dove

Chaemepelia inca LESSON, *Oeuvres complètes de Buffon*, vol. 20, 1847, p. 211 (México).

In the vicinity of Liberia the Inca dove was fairly common so that two or three or more were noted nearly every day that I was afield. Their monotonous *coo-coó* is rendered by the country man as *San Juan, San Juan*, which gives this species its local name. One taken on October 19 had developing ovaries. A male was shot on October 29.

These two birds, when compared with specimens from Nicaragua northward, are definitely paler below, the pinkish vinaceous breast being lighter and the abdomen clearer white. The species is here at its extreme southern limit and may be represented by a distinct form, a matter to be checked carefully with more material.

COLUMBIGALLINA PASSERINA NEGLECTA (Carriker)

Chaemepelia passerina neglecta CARRIKER, *Ann. Carnegie Mus.*, vol. 6, 1910, pp. 390 and 398 (Esparta, Costa Rica).

In the vicinity of Liberia these doves were common, being seen daily during work in that area. Toward the mountains to the eastward they continued to a little below Las Delicias but were not recorded higher. Three were taken on October 20, 27, and 29.

CLARAVIS PRETIOSA (Ferrari-Perez)

Peristera pretiosa FERRARI-PEREZ, *Proc. U. S. Nat. Mus.*, vol. 9, 1886, p. 175 (Brazil).

A male of this ground dove was taken on October 27 in an area of wooded pastures south of Liberia, and two more of the same sex were seen here October 30.

⁶ *Melopelia asiatica australis* Peters, *Auk*, 1913, p. 372 (Cerro Santa^aMaría, Costa Rica).

LEPTOTILA VERREAUXI VERREAUXI Bonaparte

Leptotila verreauxi BONAPARTE, Compt. Rend. Acad. Sci. Paris, vol. 40, 1855, p. 99 (Colombia).

A male of this pigeon was taken near Liberia on October 28, 1940, and the birds were seen regularly in this region. At the Río Colorado I observed one resting in the sun in early morning in a tall tree top fully 100 feet above the ground. When startled it pitched at once into cover below. In an extended acquaintance with various races of this pigeon I have never before seen one in such a situation as the species is normally found near the ground. Two seen at the Hacienda Santa María on November 9 seemed darker in color, but of this I was not certain as I did not shoot one.

OREOPELEIA MONTANA (Linnaeus): Ruddy Quail-dove

Columba montana LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 163 (Jamaica).

On November 15 I shot a female in an open thicket surrounded by pastureland below the house on Hacienda Santa María.

Family PSITTACIDAE**ARA MACAO (Linnaeus)**

Psittacus Macao LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 96 (South America).

One of the delights experienced at the Hacienda Santa María was the sight each day of these great macaws—not one alone but a dozen, or a hundred, according to where my work took me. As I rode out in early morning across the undulating pastures pairs or little flocks came past me, fairly glowing with color in the morning sun. And in the vast forests I heard their raucous calls in many places. They came daily to wild fruit trees in the little coffee plantation back of the house, and as I prepared specimens each afternoon, if the weather was clear, I could often see the flash of their brilliant plumage in the trees a hundred yards away. Occasionally when something startled them, 40 or 50 would sweep out around the house with strident calls. The birds were molested little and so were tame. On November 9 when I took one for a specimen I had only to walk out into the coffee plantation directly to where macaws were feeding without attempt at concealment. At the shot the companion birds did not trouble to leave the tree.

The macaw here is known as the *lapa*. In evening those from near the house left before sunset, most of them flying around the slopes to the east but a few going directly out over the lowlands to the southwest. Near Liberia on November 2 three passed over high in the air coming from the direction of Nicoya and traveling toward the Volcán Rincón de la Vieja, so that I believed that they flew

across into the mountains of the Nicoya Peninsula. As they pass near at hand their colors flash and the long tail feathers undulate in the wind. In distant flight they travel high in a direct line with steadily moving wing beat when the long, streaming tail gives them a curious outline. As I left the hacienda early on the morning of November 16 a flock of 40 or 50, a brilliant group, came circling low over my head, a farewell to please the heart of any naturalist.

Although *Ara ambigua ambigua* is recorded only from eastern Costa Rica it is certain that it occurs on Rincón de la Vieja. A *lapa verde*, or green macaw, was well known there, and one came with the red ones to the house occasionally. I did not see it personally, but it was reported to me so that I was certain of its presence. High on the mountain I heard macaw notes that seemed somewhat different from those ordinarily heard from *Ara macao*. I thought that they came from the green birds, but among the steep slopes and the great trees I did not succeed in approaching the birds responsible for these calls.

PYRILIA HAEMATOTIS HAEMATOTIS (Sclater and Salvin)

Pionus haematotis haematotis SCLATER and SALVIN, Proc. Zool. Soc. London, Aug. 1860, p. 300 (Vera Paz, Guatemala).

Soon after daylight on November 12 Carlos Aguilar called me to see some small parrots in the coffee plantation at the Hacienda Santa María. Among the dim, shadowed branches presently I made out two resting close together, and after securing them a chattered call drew attention to another. These three were the only ones seen.

While Peters ⁷ has placed this species in the genus *Pionopsitta* of Bonaparte, *haematotis* differs definitely from the type of that genus, *P. pileata*, in slender, compressed bill, and much shorter tail and so it is logical to follow Ridgway ⁸ and segregate it in a separate group, *Pyrilia*. The decidedly swollen bill in *pileata* is especially striking. The downs in *haematotis* are heavily developed and show among the contour feathers.

ARATINGA CANICULARIS CANICULARIS (Linnaeus)

Psittacus canicularis LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 98 (northwestern Costa Rica).

Near Liberia these parakeets, known as the *chococho*, were so common that they were seen daily. At the end of October screeching flocks flew about the brush-grown pastures at the Río Colorado, while later they were found in larger numbers along the Río Liberia. November 3, I recorded one flock of 200, and Carlos Aguilar saw an even larger band near town one evening. Specimens were taken on October 20 and 28.

⁷ Check-list of birds of the world, vol. 3, 1937, p. 211.

⁸ U. S. Nat. Mus. Bull. 50, pt. 7, 1916, p. 203.

BROTOGERIS JUGULARIS JUGULARIS (P. L. S. Müller)

Psittacus jugularis P. L. S. MÜLLER, Natursystem, Suppl., 1776, p. 80 (Bonda, Santa Marta, Colombia).

At the Hacienda Santa María I found a pair of these parakeets at an old woodpecker hole in a dead palm and preserved the male. Others were seen here on November 7 and 13. The flight of these birds is swift and darting and resembles that of one of the fast-flying bats like *Tadarida*.

AMAZONA ALBIFRONS NANA W. DeW. Miller

Amazona albifrons nana W. DEWITT MILLER, Bull. Amer. Mus. Nat. Hist., vol. 21, 1905, p. 349 (Calotmul, Yucatán).

Near Liberia these parrots were so common that they were seen daily in morning and evening passage across the sky, and occasionally I found small flocks feeding in the forest. I identified them in flight by size and by the red in the wing, aided occasionally by a glimpse of the white forehead as they passed. At sunset on the evening of November 16 a flock of 200 flew over the town in scattered formation. Two were taken on October 24. A few were recorded in the open country below the house at the Hacienda Santa María on November 12 and 15.

In the two taken the wing in the male measures 158 mm., and in the female 156 mm.

AMAZONA OCHROCEPHALA AURO-PALLIATA (Lesson)

*Psittacus (amazona) auro-palliatu*s LESSON, Rev. Zool., ser. 2, vol. 4, May 1842, p. 135 (Realejo, Nicaragua).

Near Liberia these parrots were common, being seen most frequently in the morning and evening flights. Occasionally I found small flocks resting in the early morning sun or feeding in forest trees that were in fruit. A female was shot from the top of a tall guanacaste tree on October 30. They were common in captivity, being kept with wings clipped, sometimes on a perch, and sometimes in a small tree beside the door. Although they often called as their wild brethren flew screeching overhead they did not appear interested in them otherwise.

Family CUCULIDAE**PIAYA CAYANA STIRTONI van Rossem**

Piaya cayana stirtoni VAN ROSSEM, Trans. San Diego Soc. Nat. Hist., vol. 6, Sept. 30, 1930, p. 209 (Mount Cacaguatique, El Salvador).

The squirrel-cuckoo was fairly common near Liberia along the Río Liberia and the Río Colorado. Specimens were preserved on October 26 and November 17.

The present species is most interesting in the variations that it exhibits in different sections of its vast range. On the Pacific slope of

Central America and México these birds are definitely paler in color than those on the Atlantic side, the eastern birds, *thermophila*, marked by darker hues both above and below, being fairly uniform from Tamaulipas south to Panamá. Those from the Pacific side, while always paler, are more variable, so that three forms are at present recognized, the palest being *extima* in southern Sonora and northern Sinaloa. Another race, *mexicana*, is found in western and southwestern México, while *stirtoni* is described from El Salvador. The only break on the west side seems to be in Guatemala where Griscom has recorded an extensive series from the Pacific slope as the darker-colored *thermophila*. The specimens from Liberia, while slightly darker than *stirtoni* from farther north, are to be identified as that race, which in this slightly intermediate type extends down through Pigres and San Mateo on the Pacific slope of Costa Rica to David and Boquete in northwestern Panamá, according to specimens in the U. S. National Museum. The latter localities mark a considerable extension of the previously reported range.

PIAYA CAYANA THERMOPHILA P. L. Sclater

Piaya thermophila P. L. SCLATER, Proc. Zool. Soc. London, 1859, p. 368 (Jalapa, Veracruz, México).

On the southern and southeastern slopes of Volcán Rincón de la Vieja squirrel-cuckoos were fairly common, specimens being taken on November 5 and 11. As the sun appeared after rain one morning I saw one preening its feathers in the very top of a tall dead tree at the edge of a clearing.

The two listed from the Hacienda Santa María, one taken above the house at the edge of the Pacific side of the divide, and the other two miles or more farther east near Los Cuadros at the head of the Atlantic drainage, are both distinctly darker than those obtained at Liberia and, while intermediate, belong definitely with *thermophila*, which is darker colored than *stirtoni*. This section therefore is on the line of union between these two races.

CROTOPHAGA SULCIROSTRIS SULCIROSTRIS Swainson

Crotophaga sulcirostris SWAINSON, Phil. Mag., new ser., vol. 1, 1827, p. 440 (Temascaltepec, México).

Near Liberia the groove-billed ani was common through pasturelands and fields where it was seen daily. I shot one for a specimen on November 3. At the airports in Santa Cruz and Tempisque as our plane came in to a landing I saw little flocks flying hastily to one side. The ordinary name for this species in Costa Rica is *tico*, in Guanacaste modified usually to *tinco*. More rarely I heard them called *zopilotillo*, from their habit of resting with wings spread in the sun like a little zopilote.

MOROCOCCYX ERYTHROPYGA ERYTHROPYGA (Lesson)

Coccyzus erythropyga LESSON, Rev. Zool., vol. 5, July 1842, p. 210 (San Carlos, Centre Amérique=La Unión, El Salvador).⁹

Near Liberia these curious cuckoos were fairly common in the dense growth of old fields and the thickets adjacent, though only by chance did I come across them. Specimens were taken on October 22 and 28. I found them on the ground, either in grass or in partly overgrown paths, but seldom saw them in the dense cover until they flushed. Sometimes they flew rapidly and expertly for 70 or 80 yards before dropping down again into cover, but more often they alighted in the edge of a thicket under shelter to remain quiet until finally they dropped down and disappeared. I had the feeling that I overlooked many of them near at hand in the dense cover. On the Hacienda Santa María I saw them at the borders of the pastures at about 1,800 feet, and also near Las Delicias. A male had the soft parts colored as follows: Mandible and lower half of maxilla honey yellow; upper half of maxilla down to nostril dusky neutral gray; edge of eyelids and space in front of eye light yellow; line immediately behind gape and extensive bare area behind and above eye clear, light blue; tarsus and toes light reddish brown; claws fuscous; iris dull brown.

Family TYTONIDAE

TYTO ALBA GUATEMALAE (Ridgway)

Strix flammea var. *Guatemalae* RIDGWAY, Bull. Essex Inst., vol. 5, 1873, p. 200 (Chinandega, Nicaragua).

During my stay in Liberia I heard or saw barn owls nearly every evening around the church or in the plaza in front of it. On October 30 and subsequently the chatter of young came from some concealment in the church walls. One or two birds that I saw flying in early evening appeared quite dark colored on the breast.

Family STRIGIDAE

OTUS COOPERI (Ridgway)

Scops cooperi RIDGWAY, Proc. U. S. Nat. Mus., vol. 1, Aug. 15, 1878, p. 116 (Santa Ana, Costa Rica).

At the Hacienda Santa María on November 12 I shot a male of this screech owl that flushed from a tangle of vines in a small grove at an elevation of 1,800 feet.

The bristle-grown toes mark this species from its relatives.

⁹See van Rossem, Publ. Field Mus. Nat. Hist., zool. ser., vol. 23, 1938, pp. 19, 218.

Family CAPRIMULGIDAE

NYCTIDROMUS ALBICOLLIS INTERCEDENS Griscom

Nyctidromus albicollis intercedens GRISCOM, Amer. Mus. Nov., No. 379, Oct. 17, 1929, p. 8 (Tela, Honduras).

Four cuiejos were taken near Liberia on October 22 and 30 and November 1 and 2. Peters¹⁰ has placed *intercedens* as a synonym of typical *albicollis*, but after examination of a good series I feel that it is distinct, with a range from southern Chiapas (Finca Esperanza) to Panamá and northern Colombia. In examining *Nyctidromus* it is necessary always to recall that there are two color phases, one rufescent and the other grayish. With this borne in mind those birds that I have distinguished as *intercedens* while agreeing with *albicollis* in size are definitely lighter in color. They are darker and slightly smaller than *yucatanensis*.

The cuiejo was common in woodlands near Liberia as well as in the groves that filled hollows in the pasture lands below the house at Hacienda Santa María. I saw them regularly and no doubt they were more abundant than my observations indicated. According to country superstition the bill and bones dried and finely ground and put in any fluid that is drunk make a potent love charm.

CHORDEILES ACUTIPENNIS TEXENSIS Lawrence: Texas Nighthawk

Chordeiles texensis LAWRENCE, Ann. Lyc. Nat. Hist. New York, vol. 6, Dec. 1857, p. 167 (Ringsgold Barracks near Rio Grande City, Tex.).

Half a dozen of these nighthawks circled over the church and the adjacent park on the evening of October 22, and I noted the birds regularly here until my departure. Their numbers varied somewhat and at times hundreds were present. The town people knew them by the name of *gavilán*.

Occasionally I saw one during the day in the country resting along a tree limb, and I shot two females in such situations on October 24 and November 18. With a wing measurement of 175 mm. both of these birds belong evidently with the northern, migrant race. The Central American nighthawk, *C. a. micromeris*, which is distinguished by smaller size, was undoubtedly present, as I observed occasional birds that appeared smaller than the others, but I obtained no specimens.

Family TROCHILIDAE

ARCHILOCHUS COLUBRIS (Linnaeus): Ruby-throated Hummingbird

Trochilus Colubris LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 120 (South Carolina).

The rubythroat was common about flowers in an area where thickets and woodland were intermingled with pastures to the south

¹⁰ Check-list of birds of the world, vol. 4, 1940, p. 193.

of Liberia. I shot two here on October 27 and two more on October 31. Three of these are young males with a few metallic red feathers appearing on the throat.

FLORISUGA MELLIVORA MELLIVORA (Linnaeus)

Trochilus mellivorus LINNAEUS, *Systema naturae*, ed. 10, vol. 1, 1758, p. 121 (Guiana).

On October 26 near Liberia I secured a male of this hummingbird, not quite adult, from a shaded perch along a roadway at the border of a bush-grown field.

CHLOROSTILBON CANIVETHI SALVINI (Cabanis and Heine)

Chlorolampis salvini CABANIS and HEINE, *Museum Heineanum*, pt. 3, 1860, p. 48 (Costa Rica).

Near Liberia I secured specimens of this hummer on October 21, 22, and 31 at the edge of heavy woodland. They were quick, alert, and difficult to shoot. On the Hacienda Santa María I found them occasionally in the coffee plantation near the house, or in the groves of gallery forest below, taking a male November 13. A female taken on October 21 was laying.

While I have followed current usage in listing *salvini* as a race of *canivetii* it appears to me that the shorter-tailed forms, including *salvini*, may be specifically distinct from the more northern ones, *canivetii*, *auriceps*, and *forficatus*, the latter having decidedly longer, more deeply forked tails, with the elongated feathers appearing narrower.

ANTHRACOTHORAX PREVOSTII GRACILIROSTRIS Ridgway

Anthracothorax prevosti gracilirostris RIDGWAY, *Proc. Biol. Soc. Washington*, vol. 23, Apr. 19, 1910, p. 55 (Bolsón, Costa Rica).

The only slender-billed mango seen was a female shot on October 30, 1940, at the edge of heavy woodland near Liberia.

AMAZILIA RUTILA RUTILA (Delattre)

Ornismya rutila DELATTRE, *Echo du Monde Savant*, ser. 2, vol. 7, No. 45, June 15, 1843, col. 1069 (Acapulco, Guerrero, México).

The cinnamon hummingbird was fairly common near Liberia through groves adjoining cultivated fields. Two males taken on October 28 are decidedly greener above than any others in the National Museum collection, owing apparently to fresher plumage.

HYLOCHARIS ELICIAE (Bourcier and Mulsant)

Trochilus eliciae BOURCIER and MULSANT, *Ann. Sci. Phys. Nat. Lyon*, vol. 9, 1846, p. 314 (type locality not known).

Near Liberia *Elicia*'s golden-tailed hummingbird was more common than other hummers at this season. Those taken include a female

from the Río Colorado, October 20, and three males nearer the town on October 22 and 26. They were found in shaded places where the ground was open and water not far distant. Many sections of woodland along the Río Liberia were favorable to them, and I found them also along the steep-walled quebradas inland. At the Río Colorado there was one place that was especially favored, a deep, wide quebrada with sandy floor where the trees met overhead and there were pools of water along the channel. While resting in this cool, pleasant place I was sure to hear the low humming made by the wings of this bird, but in the obscure light it was difficult sometimes to see them on the dead twigs on which they perched. The pinkish base of the bill was the most prominent marking in life.

ANTHOSCENUS CONSTANTII CONSTANTII (Delattre)

Ornismya Constantii DELATTRE, Echo du Monde Savant, ser. 2, vol. 7, No. 45, June 15, 1843, col. 1069 (Bolsón, Costa Rica).

In small numbers these hummingbirds were found at the borders of heavy woodland or along brush-lined roadways near Liberia. I collected males on October 28 and 30.

Griscom¹¹ reports that the type of *constantii*, now in the American Museum of Natural History, while marked "Guatemala" is typical in color of the bird found in Costa Rica. As the bird of Guatemala is the paler race *A. c. leocadiae*, he proposes Bolsón, Costa Rica, as the type locality for *constantii*.

Family TROGONIDAE

TROGON ELEGANS AUSTRALIS Griscom

Trogon elegans australis GRISCOM, Proc. New England Zoöl. Club, vol. 12, Apr. 3, 1930, p. 3 (Bagaces, Guanacaste, Costa Rica).

The two trogons of this race taken were secured near Liberia on November 1 and 2. They were found in heavy woods and were especially common along the Río Colorado.

TROGON MELANOCEPHALUS ILLAETABILIS Bangs

Trogon melanocephalus illaetabilis BANGS, Proc. Biol. Soc. Washington, vol. 22, Mar. 10, 1909, p. 30 (Bolsón, Costa Rica).

The slaty-headed trogon, taken on October 27 and 29, was a common species near Liberia, being found in groves scattered through pastures, as well as in heavy woodland. The loud call, beginning as a cooing note, and at the end becoming so rapid that it terminates in

¹¹ Bull. Amer. Mus. Nat. Hist., vol. 64, 1932, pp. 210-211.

a rattle, is like that of the northern subspecies which I have heard in Mexico. The birds were alert and active, especially when I encountered them in more open localities. The trogons are known here as *viuda*.

Family ALCEDINIDAE

CHLOROCERYLE AMAZONA MEXICANA Brodkorb

Chloroceryle amazona mexicana BRODKORB, Auk, 1940, p. 543 (Barra de Cahuacán, Chiapas).

Near Liberia these kingfishers were seen in small numbers along the Río Liberia and Río Colorado, and once one was observed at a temporary pool of water formed by recent rains. A female was taken on October 22. This specimen has the white mark in front of the eye indistinct, and a wing measurement of 135 mm. On comparing a fair series found in the National Museum I find that the characters pointed out by Brodkorb in describing this race, while slight, seem to hold, except that the tail measurement in birds from South America and in those from México and Central America is about the same. The development of the white streak in front of the eye is highly variable but has its maximum extent in South American birds. It may, however, be absent in specimens from that area. Following are measurements from our series:

C. a. amazona:

Males (10 specimens), wing 122–132, tail 69.7–79.6.

Females (13 specimens), wing 125–137, tail 72.5–82.3.

C. a. mexicana:

Males (11 specimens), wing 129–140, tail 70.8–77.6.

Females (12 specimens), wing 132–142, tail 74.4–78.8.

It will be noted that though the smallest birds come from South America there is a definite overlap. Birds from Colombia are intermediate but seem to me closer to true *amazona*, which apparently should cover all specimens north to Panamá.

CHLOROCERYLE AMERICANA ISTHMICA (Goldman)

Ceryle americana isthmica GOLDMAN, Smithsonian Misc. Coll., vol. 56, No. 27, Dec. 1, 1911, p. 1 (Río Indio, near Gatun, Canal Zone).

Two females of the green kingfisher were taken near Liberia, one over a sluggish channel near the Río Colorado November 1, and one along the Río Liberia November 3.

These birds, with wing measurements of 80.3 and 81.6 mm., belong with the Panamanian race, being marked by a reduction of the white markings on the wings.

CHLOROCERYLE AENEA STICTOPTERA (Ridgway)

Ceryle superciliosa stictoptera RIDGWAY, Proc. Biol. Soc. Washington, vol. 2, Apr. 10, 1884, p. 95 (Sisal, Yucatán).

The only one seen, a female, was taken near the Río Colorado, November 1. This mite of a kingfisher rested on a twig over a forest pool along a small, sluggish stream, jerking its tail with all the mannerisms of its larger relations.

This specimen agrees with birds from México in having the white markings on the secondaries extensive, and it is to be placed with the northern race. It is interesting to record this fact since two in the National Museum taken at Bebedero, near the mouth of the Río Tempisque, by Alfaro on January 23 and by Underwood on February 20 in 1890, have these light markings on the wing so reduced that they are to be identified with the typical race *aenea*. Both forms then are found in western Costa Rica, the dividing line between them being somewhere between the Río Colorado north of Liberia and the lower section of the Tempisque.

Family MOMOTIDAE


MOMOTUS LESSONII LESSONII Lesson

Momotus Lessonii LESSON, Rev. Zool., vol. 5, June 1842, p. 174 (Realejo, Nicaragua).

A male of this motmot was shot on November 14 in the coffee plantation back of the house at the Hacienda Santa María. It rested on a branch with the tail swinging, pendulumlike, from side to side. No others were recorded, but it is supposed that the birds were found regularly in the forested region to the east and northeast.

EUMOMOTA SUPERCILIOSA AUSTRALIS Bangs

Eumomota superciliaris australis BANGS, Proc. Biol. Soc. Washington, vol. 19, July 30, 1906, p. 104 (Bebedero, Guanacaste, Costa Rica).

Near Liberia these motmots were common in the open woodlands bordering the river, in trees along the dry quebradas inland, and in groves and thickets spread through the pastures south of town, all these being areas in which earthen banks provided places for nest holes. The note, a low *hoo-hoot*, in tone is lower and softer than the call of the larger *Momotus lessonii lessonii*.  Skins were prepared on October 21, 27, and 30 and November 18.

This form evidently extends into southern Nicaragua, as there is a specimen in the National Museum from Sucuyá, near Rivas, collected by Nutting. Birds from farther north (Managua and Chinandega) belong to *E. s. apiastur*.

HYLOMANES MOMOTULA OBSCURUS Nelson

Hylomanes momotula obscurus NELSON, Smithsonian Misc. Coll., vol. 56, No. 22, Sept. 7, 1911, p. 1 (Cerro Brujo, Canal Zone).

Two males of this motmot were taken in heavy forest on the slopes of Cerro Santa María. On November 10 at 900 meters elevation one rested on a low perch among bushes 3 or 4 feet above the forest floor where arching trees made a heavy canopy overhead though the space below was open. As the bird turned its head, in spite of the dim light, I noted a distinct flash of color from the blue superciliary stripe and the light mark below the eye. On November 11, in a similar situation at a lower elevation above the section known as Los Cuadros, I secured another from a perch 6 feet from the ground.

After examination of a small series of these birds the only character that I discern to distinguish a southern form is that, when laid out in geographic order, birds from northwestern Costa Rica and Panamá have the abdomen duller, while in those from Honduras northward into southeastern México this area is definitely whitish.

Family RAMPHASTIDAE

AULACORHYNCHUS CAERULEOGULARIS (Gould)

Aulacorhamphus caeruleogularis GOULD, Zoologist, Apr. 1853, p. 3861 (Veragua, Panamá).

Two of these toucanets were seen November 14 near the Hacienda Santa María, one near the house and the other at 800 meters elevation in the forest above.

PTEROGLOSSUS TORQUATUS TORQUATUS (Gmelin)

Ramphastos torquatus GMELIN, Systema naturae, vol. 1, pt. 1, 1788, p. 354 (Central America).

Near Liberia I shot one of two seen on October 22. Above the Hacienda Santa María on November 10, as a flock of macaws passing overhead threw a shadow over the forest, one of these toucans came down precipitately through the branches to hide beneath limbs near at hand where I secured it. Apparently some predatory hawk was about. This species is known here as the *feliz*.

RAMPHASTOS SULFURATUS BREVICARINATUS Gould

Ramphastos brevicarinatus GOULD, A monograph of the Ramphastidae, ed. 2, 1854, pl. 3 and text (Panamá).

Though by chance I took no specimens, these toucans were common on the Hacienda Santa María. On November 9, when rain had fallen during the night on the mountain and continued during the forenoon, I saw two flocks, each of 15 or more birds, that had come down out of the clouds that enveloped the mountain to feed on berries at the

borders of the thickets scattered through the rolling pasturelands below the forest. It was highly amusing to watch them hopping awkwardly around, as we passed only 40 or 50 feet away. On November 11 after another rain I saw two flocks perched in the open in small groves in the pastures.

Family PICIDAE

PHLOEOCEASTES GUATEMALENSIS GUATEMALENSIS (Hartlaub)

Picus guatemalensis HARTLAUB, Rev. Zool., vol. 7, 1844, p. 214 (Guatemala).

On October 24 I shot a pair from dead trees in a new clearing in the forest along the river above Liberia. October 30 I watched another pair working at a nest hole 40 feet from the ground in a dead tree standing in a bushy pasture. The female was inside working, while the male clambered up and down the trunk occasionally looking in at her. On November 7 I recorded one below the house at the Hacienda Santa María in a wooded ravine leading through the pastures.

Recently Dickey and van Rossem¹² have stated that the ivory-billed woodpeckers of this group from Costa Rica and Panamá are separable from typical *guatemalensis* by a yellowish or buffy suffusion on the ventral surface. After comparison of a good series from Costa Rica, including the two fresh specimens that I secured at Liberia, with an equally good lot from Guatemala and Honduras, I find that the alleged difference does not hold, birds being whitish or yellowish in cast without regard to their occurrence in the geographic regions stipulated. I believe that the supposed variation may be due in part to adventitious stain, and so it would occur at random.

CEOPHLOEUS LINEATUS SIMILIS (Lesson)

Picus similis LESSON, Oeuvres complètes de Buffon, vol. 20, Apr. 1847, p. 204 (San Carlos, El Salvador).

Above the town of Liberia I shot a male of this species on October 25 in the same forest clearing where I had taken *Phloeoceastes guatemalensis guatemalensis* on the previous day. So similar are these two woodpeckers that, in fact, I killed this bird by a snap shot under the impression that it was *Phloeoceastes*, not realizing its true identity until it was in the hand. On October 27 I saw a pair working over fence posts and small trees in a region of partly wooded pastures south of town. They were alert but tame, jerking the head constantly and throwing the crest erect, and occasionally giving a rattling call faintly suggestive of the note of the pileated woodpecker of the United States. The following day I noted a pair in dead trees scattered through cultivated fields. These birds are much easier to skin than *Phloeoceastes*.

¹² Publ. Field Mus. Nat. Hist., zool. ser., vol. 23, 1938, p. 320.

I have followed present usage in calling this specimen *similis* but feel that the species is one in need of revision when more material becomes available.

CENTURUS HOFFMANNII Cabanis

Centurus Hoffmannii CABANIS, Journ. für Orn., 1862, p. 322 (Costa Rica).

Near Liberia Hoffmann's woodpecker was a common species through regions of groves in fields and pastures and was observed daily. In fact, the first bird that I obtained as a specimen on the expedition was of this species when, with Dr. Juvenal Valerio Rodríguez, Director of the Museo Nacional, I shot one at the Río Liberia near town on October 19. Others were taken here on October 21 and 22. At the Hacienda Santa María a few were found near the house in the coffee plantation and in the trees of the pastures nearby. Two were taken on November 10 and 14. I saw them feeding on the juice of ripe oranges and sometimes noted that one bird claimed as feeding territory one or two orange trees, attempting to keep others away.

This woodpecker in color and markings is closely similar to *Centurus aurifrons aurifrons* and the related *C. a. polygrammus* and *C. a. frontalis* but differs from these in relative proportion of tail to wing, the tail being appreciably shorter. While evidently of the same group, *hoffmannii* on this basis is to be regarded as specifically distinct. It may be noted also that it is smaller, the wing measurement in the largest *hoffmannii* being slightly shorter than in the smallest of the *aurifrons* group that I have examined. I believe that *hoffmannii* and those races of *aurifrons* that are generally similar in bold color pattern of the dorsal surface, and otherwise resemble one another in coloration, are near the primitive stock from which these woodpeckers have come.

Family DENDROCOLAPTIDAE

DENDROCINCLA HOMOCHROA ACEDESTA Oberholser

Dendrocinclla homochroa acedesta OBERHOLSER, Proc. Acad. Nat. Sci. Philadelphia, Apr. 1904, p. 462 (Chiriquí, Panamá).

Four of these woodhewers were taken near the Hacienda Santa María November 10 and 12 as they climbed over tree trunks near the ground in company with a little band of other birds that were gathered over a moving line of ants. They were quiet and were found only by careful watching, though their ochre-brown color caught the eye as they moved behind branches. On the back of the neck the feathering is interrupted by a distinct apterium that leaves much of this area bare. The head is large, while the slender neck has the skin closely applied, so that in preparing them as specimens I had to split the skin over the back of the head to pull through the skull.

SITTASOMUS GRISEICAPILLUS SYLVOIDES Lafresnaye

Sittasomus sylvoides LAFRESNAYE, Rev. Mag. Zool., 1850, p. 590 (State of Veracruz, México).

A male taken on November 8 in heavy forest at Los Cuadros on the Hacienda Santa María was the only *Sittasomus* seen.

This bird and all others in the National Museum from Tenorio and Bolsón in Guanacaste all are slightly paler than examples from Guatemala and México, apparently showing intergradation toward race *levis* of western Panamá.

XIPHORHYNCHUS FLAVIGASTER EBURNEIROSTRIS (Des Murs)

Dryocopus eburneirostris DES MURS, Iconographie ornithologique, livr. 9, July 1847, pl. 52, with text (Realejo, Nicaragua).

The only one of these woodhewers seen was a female taken on November 8 in heavy forest near the Hacienda Santa María. This bird is very dark in tone, but is matched by occasional specimens from México. It measures as follows: Wing 103.8, tail 78.7, culmen from base 38.4, tarsus 24.2 mm., being thus decidedly smaller than *X. f. ultimus* Bangs and Griscom¹³ from the southern end of the Nicoya Peninsula.

XIPHORHYNCHUS TRIANGULARIS PUNCTIGULUS (Ridgway)

Dendroornis punctigula RIDGWAY, Proc. U. S. Nat. Mus., vol. 11, Sept. 20, 1889, p. 544 (Naranjo, Costa Rica).

These woodhewers were found in the heavy forest of the Hacienda Santa María from the old plantation at Los Cuadros to the summit of Cerro Santa María. Usually they were in company with little groups of other forest-loving birds. They were quiet in habits and no doubt were often overlooked as they climbed over the tree trunks. Four specimens were taken on November 5, 6, and 14.

The National Museum has a considerable series of *punctigulus* from various localities. The four from the slopes of Rincón de la Vieja appear distinctly more yellowish green both above and below, with the spots on the under surface yellower when compared with specimens that we have had for years. I am inclined to believe that this difference may be due to post-mortem fading in the older specimens, since a series taken at La Vijagua in 1908 by C. F. Underwood resembles the other older birds, though this locality is not far to the south from where I collected in 1940.

DENDROCOLAPTES CERTHIA SANCTI-THOMAE (Lafresnaye)

Dendrocops Sancti-Thomae LAFRESNAYE, Rev. Mag. Zool., 1852, p. 466 (Santo Tomás, near Omoa, Honduras).

Near Liberia in a tract of heavy forest on low ground on October 30

¹³ *Xiphorhynchus flavigaster ultimus* Bangs and Griscom, Proc. New England Zool. Club, vol. 13, Nov. 7, 1932, p. 48 (Ojo Ancho, Nicoya, Costa Rica).

I secured three of these woodhewers. Attention was drawn to them by their chattering calls as they clambered over the tree trunks. On the Hacienda Santa María I secured three more on November 6, 8, and 9, also in stands of heavy forest. One was accompanying a flock of other forest birds.

These six specimens have heavy black bars below and are strongly marked, showing no approach to *D. c. hesperius* Bangs of southwestern Costa Rica, in which the barrings are slightly narrower, and are duller black. There are specimens of *hesperius* in the National Museum from Pigres, Paso Real, and Pozo del Río Grande.

Family FURNARIIDAE

XENOPS MINUTUS RIDGWAYI Hartert and Goodson

Xenops genibarbis ridgwayi HARTERT and GOODSON, Nov. Zool., vol. 24, Aug. 31, 1917, p. 417 (Tocoumé, Panamá).

The two taken were shot in the forest near the Hacienda Santa María on November 6 and 8 as they climbed over masses of vines, a common habit with these ovenbirds. Always the light malar streak is a prominent mark that catches the eye.

There is one skin in the National Museum taken by Juan Cooper in May 1874, in Talamanca, that has the tail definitely longer than any other that I have seen. The wing also is long and the feet appear large, suggesting that there may be a local race of limited range in that area. Measurements of this bird (U. S. N. M. No. 68292) are as follows: Wing 67, tail 53.2, culmen from base 14.2, tarsus 15.1 mm.

SCLERURUS ALBIGULARIS CANIGULARIS Ridgway

Sclerurus canigularis RIDGWAY, Proc. U. S. Nat. Mus., vol. 11, Sept. 20, 1889, p. 542 (Turrialba, Costa Rica).

On November 14 I shot a male of this ovenbird near the summit of the mountain above the Hacienda Santa María. The bird, dark in color and heavy in body, decoyed in dense undergrowth in heavy forest.

Family FORMICARIIDAE

PHAENOSTICTUS MCLEANNANI SATURATUS (Richmond)

Phlegopsis saturatus RICHMOND, Proc. U. S. Nat. Mus., vol. 18, Aug. 12, 1896, p. 625 (Río Escondido, 50 miles from Bluefields, Nicaragua).

Near the old plantations at Los Cuadros on the Hacienda Santa María these antbirds were fairly common but were so shy that I secured only two males with some difficulty on November 8 and 9. They frequented dense undergrowth in heavy forest, and as I approached slipped quietly away ahead of me. The call is a clear

whistle of varied tone, an erratic scale that is easily mimicked. They replied to my imitation time after time, and occasionally flew up from the ground to cling for an instant to some low branch, offering the only opportunity for a shot. In the obscure light of their jungle haunt, they appeared uniformly dark in color, so that in the hand it was a pleasant surprise to see the variegated pattern of the plumage and the brilliant blue of the bare skin of the side of the head. This was one of the strangest of the interesting inhabitants of this grand forest.

HYLOPHYLAX NAEVIOIDES CAPNITIS (Bangs)

Hypocnemis naevioides capnitis BANGS, Proc. Biol. Soc. Washington, vol. 19, July 30, 1906, p. 107 (Volcán Miravalles, Costa Rica).

On the slopes of Volcán Rincón de la Vieja this was one of the commonest of the birds that gathered over the moving ant armies in the forests. It was found from Los Cuadros to the summit of Cerro Santa María, usually in little parties. On my first encounter the chattering, insistent note with which this antbird greets intruders was a mystery for several minutes, as it was difficult to decide whether it came from the tree tops or from the undergrowth, until finally I caught sight of the bird near the ground. Ordinarily they worked along a foot or so above the ant columns, moving actively and uttering their chattering calls. Specimens were secured on November 5, 8, 9, and 11.

MYRMOTHERULA SCHISTICOLOR SCHISTICOLOR (Lawrence)

Formicivora schisticolor LAWRENCE, Ann. Lyc. Nat. Hist. New York, vol. 8, 1865, p. 173 (Turrialba, Costa Rica).

The only one of these antbirds seen was shot on November 8 in undergrowth at the edge of an old clearing at Los Cuadros on the Hacienda Santa María.

DYSITHAMNUS MENTALIS SEPTENTRIONALIS Ridgway

Dysithamnus mentalis septentrionalis RIDGWAY, Proc. Biol. Soc. Washington, vol. 21, Oct. 20, 1908, p. 193 (Choctum, Vera Paz, Guatemala).

In the heavy forest on the Hacienda Santa María these small birds were fairly common. In spite of their stocky little bodies they are active in movement through the undergrowth and the lower tree tops. They formed a regular part of the little groups of forest birds that moved in scattered parties in company through the trees, like migrant warblers in fall in the North. Though active they were often shy. On November 5 I encountered several groups on the high shoulder of the mountain back of the hacienda in the section known as Papal and

collected two. Another was shot on November 6 at Los Cuadros, and on November 14 I secured another at the summit of the mountain.

The three specimens preserved as skins, a male and two females, are in fresh plumage and are decidedly yellower than the rest of our series, the male agreeing with Ridgway's statement on the immature male in having the abdomen distinctly yellow.

DYSITHAMNUS STRIATICEPS Lawrence

Dysithamnus striaticeps LAWRENCE, Ann. Lyc. Nat. Hist. New York, vol. 8, May 1865, p. 130 (Angostura, Costa Rica).

My only specimen of this stocky, heavy-bodied little antbird was taken in low forest trees on the Hacienda Santa María on November 8. This was at Los Cuadros, which lies on the divide between the Pacific and the Caribbean slopes.

Family COTINGIDAE

ATTILA SPADICEUS CITREOPYGUS (Bonaparte)

Dasycephala citreopyga BONAPARTE, Compt. Rend. Acad. Sci. Paris, vol. 38, 1854, p. 657 (Nicaragua).

On November 8 near the Hacienda Santa María I shot one of these chatterers from a high tree top in heavy forest. The bird was moving among the branches like a tanager.

TITYRA SEMIFASCIATA PERSONATA Jardine and Selby

Tityra personata JARDINE and SELBY, Illustrations of ornithology, vol. 1, pt. 2, June 1827, pl. 24 (Real del Monte, Hidalgo).

On October 26 I shot a pair of these birds at the edge of the line of forest bordering the river below Liberia and on October 30 noted another in heavy woodland farther west. They were uncommon at this season.

It has been unexpected to find that the two specimens are representative of the northern subspecies, which has not been reported previously from Costa Rica. The male bird, with a wing 125.2 mm. in length, is darker gray above than *costaricensis*, found elsewhere in the Republic, agreeing with specimens from southeastern México. The female (with wing in molt so that it may not be measured) likewise agrees with skins from Veracruz, being paler than *costaricensis*. Specimens from farther south at Pigres are true *costaricensis*. The connection between *personata* of Guanacaste and of El Salvador and central and northern Honduras may be restricted to a narrow band along the Pacific coast, as skins from Managua, Nicaragua, are *costaricensis* and specimens from Ometepe Island in Lake Nicaragua while somewhat intermediate are nearer *costaricensis*.

Family PIPRIDAE

CORAPIPO LEUCORRHOA ALTERA Hellmayr

Corapipo leucorrhoa altera HELLMAYR, Bull. Brit. Orn. Club, vol. 16, May 8, 1906, p. 84 (Carrillo, Costa Rica).

The only one of these manakins seen was a female shot in the undergrowth in the heavy forest at Los Cuadros on November 6. This resembles a series from eastern Costa Rica.

CHIROXIPHIA LINEARIS FASTUOSA (Lesson)

Pipra fastuosa LESSON, Rev. Zool., vol. 5, June 1842, p. 174 (Realejo, Nicaragua).

The long-tailed manakin, called *toledo* in imitation of its musical note, was common from the region below Liberia to the jungles at 2,000 feet elevation on the Hacienda Santa María. In the lowlands they were found in brushy pastures, or in the woodlands along the streams, where they kept under cover but mewed and whistled so constantly that it was not difficult to follow them, though they were very hard to see. They were often in the dense top foliage of small trees 15 or 20 feet from the ground. Near Liberia the males had molted the long tail feathers, while higher these feathers were partly grown. The five secured were taken at Liberia on October 20 and 23 and November 1 and on the Hacienda Santa María on November 7.

Family TYRANNIDAE

MUSCIVORA FORFICATA (Gmelin): Scissor-tailed Flycatcher

Muscivora forficata GMELIN, Systema naturae, vol. 1, pt. 2, 1789, p. 931 (México).

The first one of these flycatchers was recorded at Liberia on October 24, and several were seen two days later. On October 28 many were recorded amid dead stubs standing in cultivated fields, and along the roads, and two were taken. Apparently they were then arriving in southward migration. On October 30 they were common, and on November 1 I shot another near the Río Colorado. On November 3 another wave of migrants arrived. On November 6 I saw several in the open pastures at the Hacienda Santa María. Near Liberia they were fairly common on November 17 toward the Río Colorado, and on November 18 at sunrise a band of 40 or 50 came flying out past me from the town, and many were seen in the country.

TYRANNUS MELANCHOLICUS CHLORONOTUS Berlepsch

Tyrannus chloronotus BERLEPSCH, Ornith., vol. 14, 1907, p. 474 (Temax, Yucatán).

This kingbird is one of the common birds of open country, ranging inland into the pastures below the house at Hacienda Santa María, where I secured birds on November 8 and 11. Specimens were taken near Liberia on October 24, 27, and 31 and November 2 and 18.

MYIODYNASTES MACULATUS DIFFICILIS Zimmer

Myiodynastes maculatus difficilis ZIMMER, Amer. Mus. Nov., No. 963, Nov. 18, 1937, p. 9 (Bebedero, Costa Rica).

On October 30 I shot a female of this flycatcher at the border of a heavy stand of forest below Liberia. This form has a wider range in Costa Rica than is generally understood, since we have one specimen taken by José Zeledón at Bonilla, April 5, 1905, and another secured by Anastasio Alfaro at Alajuela, April 21, 1889.

MEGARYNCHUS PITANGUA MEXICANUS (Lafresnaye)

Saurophagus mexicanus LAFRESNAYE, Rev. Mag. Zool., 1851, p. 473 (México).

These interesting flycatchers were common in open woodland along the Río Liberia and the Río Colorado, where I secured specimens on October 28 and November 1 and 3. At the Hacienda Santa María I recorded a pair in the coffee plantation near the house on November 14 and collected the female. In life the similarity of this species to the Derby flycatcher is so striking that the two may be confused. The resemblance is mainly in size and color pattern as the notes are quite distinct. *Megarynchus* has a curious rattling call given in a higher tone than the notes of the other species. It is also more liable to be found in forest than the other.

Skins from the southern part of the range in Costa Rica and from Nicaragua appear somewhat deeper and richer colored than specimens from México.

MYIOZETETES SIMILIS TEXENSIS (Giraud)

Muscicapa texensis GIRAUD, A description of sixteen new species of North American birds, 1841 (p. 57), pl. 1 ("Texas").

At the Hacienda Santa María these flycatchers came in pairs into trees about the house, where I took specimens on November 9 and 14. They fed at the ripe oranges opened by orioles and woodpeckers. I heard them utter an explosive chattering song of harsh notes.

The three specimens secured are like those from farther north in Central America.

PITANGUS SULPHURATUS GUATIMALENSIS (Lafresnaye)

Saurophagus Guatimalensis LAFRESNAYE, Rev. Mag. Zool., 1852, p. 462 (Guatemala).

Near Liberia where these flycatchers were common I secured specimens on October 27 and November 17. They were seen regularly in the town, and it was my impression that some came in each night to roost in the great fig trees of the park, for at sunrise I frequently found a dozen or more calling there. At the Hacienda Santa María they were scattered through the open pastures below the house.

The two Guanacaste specimens while dark, as is typical of *guatimalensis*, are slightly grayer, less brownish above than the average from eastern Costa Rica, Nicaragua, and Honduras.

MYIARCHUS CRINITUS CRINITUS (Linnaeus): Southern Crested Flycatcher

Turdus crinitus LINNAEUS, Systema naturae, ed. 10, vol. 1, 1758, p. 170 (South Carolina).

Three of the crested flycatchers taken at Liberia are representative of the southern form, with larger bill and darker dorsal coloration. On October 23 I shot one from an open tree at the edge of a pasture near the Río Colorado. On October 26 and November 2 others were obtained near Liberia in bushy fields and at the border of woodland.

MYIARCHUS CRINITUS BOREUS Bangs: Northern Crested Flycatcher

Myiarchus crinitus boreus BANGS, Auk, Apr. 1898, p. 179 (Seituate, Mass.).

On November 3 I secured a male in woods along the Río Liberia below Liberia. Apparently this race comes regularly to Guanacaste, as we have another taken by Underwood at Bebedero on February 12, 1890.

MYIARCHUS NUTTINGI NUTTINGI Ridgway

Myiarchus nuttingi RIDGWAY, Proc. U. S. Nat. Mus., vol. 5, Sept. 16, 1882, p. 394 (La Palma de Nicoya, Costa Rica).

Near Liberia I secured specimens of Nutting's flycatcher on October 28, 29, and 31 and November 2, finding them in brushy areas. They seemed to be common and were quite noisy. In life they appeared identical in most instances with *Myiarchus tyrannulus brachyurus*, which ranged with them, and in the short space of time of my field work I was never certain of them until I had them in the hand, though with greater familiarity it is probable that the two could be distinguished in life in most instances. The smaller bulk of the present bird, with the wing measuring under 90 mm., serves to distinguish it, as does the decidedly smaller bill when compared with *brachyurus*.

MYIARCHUS TYRANNULUS BRACHYURUS Ridgway

Myiarchus brachyurus RIDGWAY, Manual of North American birds, Sept. 1887, p. 334 (Ometepe, Nicaragua).

Near Liberia these flycatchers were common, and between October 23 and November 17 I secured nine specimens. On November 9 I shot one in the coffee plantation near the house at Hacienda Santa María. They were found in open woods and in the brushy borders of heavy forest and were active and noisy.

Van Rossem¹⁴ has found intergradation between this form and *Myiarchus tyrannulus nelsoni* in El Salvador, which affords satisfactory allocation of a bird whose previous status has been a little uncertain. He records it as confined to mangrove swamps in the

¹⁴ Publ. Field Mus. Nat. Hist., zool. ser., vol. 23, 1938, pp. 367-368.

breeding season in El Salvador, which will be an interesting point to check in studies in Guanacaste.

MYIARCHUS TUBERCULIFER NIGRICAPILLUS Cabanis

Myiarchus nigricapillus CABANIS, Journ. für Orn., 1861, p. 250 (Bonilla, Costa Rica).

At the Hacienda Santa María I shot three males of this flycatcher on November 5, 10, and 14. The birds were found scattered singly through the coffee plantation immediately back of the house and at the edge of the forest. The call is a whistled *wee* sometimes slightly trilled.

The three taken are clearly representative of the dark-headed *nigricapillus*, which ranges through eastern and central Costa Rica, here entering the edge of Guanacaste through the influence of the heavy forest on the slopes of Volcán Rincón de la Vieja.

EMPIDONAX FLAVIVENTRIS (W. M. Baird and S. F. Baird): Yellow-bellied Flycatcher

Tyrannula flaviventris W. M. BAIRD and S. F. BAIRD, Proc. Acad. Nat. Sci. Philadelphia, vol. 1, Sept. 18, 1843, p. 283 (Carlisle, Pa.).

Near the Río Colorado, northwest of Liberia, I secured two on October 20. One of these is in molt on the body and is decidedly brighter yellow than the other.

MYIOCHANES VIRENS (Linnaeus): Eastern Wood Pewee

Muscicapa virens LINNAEUS, Systema naturae, ed. 12, vol. 1, 1766, p. 327 (South Carolina).

On October 20 near Liberia, I shot one in an open-limbed tree growing at the edge of a pasture. The bird was eating a yellow butterfly.

MYIOCHANES RICHARDSONII RICHARDSONII (Swainson): Western Wood Pewee

Tyrannula richardsonii SWAINSON, Fauna Boreali-Americana, vol. 2, 1831 (1832), p. 146, pl. 46, lower fig. (Cumberland House, Saskatchewan).

A female taken on October 30 comes from Liberia. The wing measures 82.8 mm. and the tail 64.7 mm.

MYIOCHANES RICHARDSONII SORDIDULUS (Sclater)

Contopus sordidulus P. L. SCLATER, Proc. Zool. Soc. London, May 1859, p. 43 (Orizaba, Veracruz).

As four of the six wood pewees taken at Liberia late in October are this form, the Mexican wood pewee would appear to be the commonest of the three kinds that are present here as migrants. They were found along open trails in the woods bordering streams, or on open perches in clearings. On one occasion while I was storm-bound by a heavy rain with shelter in an old hut one hawked steadily for insects from an exposed perch unmindful of the downpour. Meas-

urements of the four taken are as follows: One male, October 25, wing 82.5, tail 58.8 mm.; three females, October 22 and 24, wing 78.3, 80.5, 80.5, tail 57.2, 60.4, 61.3 mm. The race is marked from the typical form by darker color above, and by shorter tail. The birds seen were silent.

MYIOBIUS SULPHUREIPYGIUS AUREATUS Bangs

Myiobius xanthopygus aureatus BANGS, Proc. New England Zoöl. Club, vol. 4, Mar. 19, 1908, p. 27 (Divala, Chiriquí, Panamá).

In the section called Los Cuadros on the Hacienda Santa María I shot two females of this flycatcher on November 6. They were found in heavy forest, where they sought low perches from which to watch for insects. In mannerisms they were much like *Empidonax*.

ONYCHORHYNCHUS MEXICANUS FRATERCULUS Bangs

Onychorhynchus mexicanus fraterculus BANGS, Proc. New England Zoöl. Club, vol. 3, Mar. 31, 1902, p. 86 (Santa Marta, Colombia).

The only one of these flycatchers seen was a male taken in a shaded thicket south of Liberia October 31. The region was one of pastures interspersed with little thickets and groves of trees.

PLATYRINCHUS CANCROMINUS Sclater and Salvin

Platyrhynchus cancrominus SCLATER and SALVIN, Proc. Zool. Soc. London, 1860, p. 299 (Choctum, Vera Paz, Guatemala).

My only specimen of this flycatcher is a male taken low down in heavy brush where there was dense shadow in a damp spot on the Río Blanco, just above its junction with the Río Colorado, northwest of Liberia. This bird does not differ as far as I can see from a series from Guatemala and México.

TOLMOMYIAS SULPHURESCENS CINEREICEPS (P. L. Sclater)

Cyclorhynchus cinereiceps P. L. SCLATER, Ibis, 1859, p. 443 (State of Oaxaca, México).

In the vicinity of Liberia, both along the Río Liberia and in the brushy pastures to the south, as well as at the Río Colorado, these flycatchers were so common that I secured a series of 10 between October 23 and November 18. They were found in heavy forest, low thickets, or scattered groves of brush in pasture lands, where they moved slowly through the smaller branches, reminding me of vireos in their manner of peering about. At this season they were silent. The iris is yellowish white and the mouth lining dark neutral gray. Several of those taken were molting.

RHYNCHOCYCLUS BREVIROSTRIS BREVIROSTRIS (Cabanis)

Cyclorhynchus brevirostris CABANIS, Arch. für Naturg., vol. 13, 1847, p. 249 (Jalapa, Veracruz, México).

On November 5 I shot a male of the short-billed flycatcher on the

forested mountain back of the house at Hacienda Santa María, in the region called Papal. The bird was moving through the lower branches of the trees.

ONCOSTOMA CINEREIGULARE (P. L. Sclater)

Todirostrum cinereigulare P. L. SCLATER, Proc. Zool. Soc. London, 1856 (Jan. 26, 1857), p. 295 (Córdoba, Veracruz).

On November 2 near Liberia I shot one of these flycatchers in heavy woodland where it was in company with other little forest birds.

LOPHOTRICCUS PILEATUS LUTEIVENTRIS Taczanowski

Lophotriccus squamicrostus luteiventris TACZANOWSKI, Ornithologie de Pérou, vol. 2, 1884, p. 231 (Chiriquí, Panamá).

At the Hacienda Santa María I shot one of these flycatchers in undergrowth near the border of dense forest as it moved slowly about perching quietly. On November 9 I secured another from a moving flock of little forest birds.

Family HIRUNDINIDAE

HIRUNDO RUSTICA ERYTHROGASTER Boddaert: Barn Swallow

Hirundo erythrogaster BODDAERT, Table des planches enluminées, 1783, p. 45 (Cayenne).

The barn swallow was seen commonly around Liberia from October 18 to November 3 and on November 18, flying over open pastures, especially at the airport. Their numbers fluctuated somewhat, and they were evidently in southward migration. As they were scattered widely it was difficult to obtain a true picture of their numbers, particularly in view of their habit of coursing over extended areas while feeding. On October 23, after a heavy rain, I found about a hundred gathered on telephone wires near the Río Colorado, and near Liberia on the same day I recorded two additional groups of 20 to 25 each. Toward the end of October they decreased in abundance briefly but were common again on November 3, and on my return from the mountains I saw many on November 18. Seven skins obtained on October 23 include adult and immature birds of both sexes.

Elsewhere in Costa Rica I recorded several near San Ramón on October 16, a flock of several hundred at the airport in Puntarenas on November 19, many at the airport in San José on November 20, and several near Cartago on November 23.

Family CORVIDAE

CALOCITTA FORMOSA POMPATA Bangs

Calocitta formosa pompata BANGS, Proc. New England Zool. Club, vol. 4, Mar. 13, 1914, p. 102 (Bolsón, Guanacaste, Costa Rica).

The magpie-jay is one of the most attractive birds that I found in

the region of my work in Guanacaste. It is, as others have said, typically a bird of the arid Tropical Zone, ranging near Liberia through the brushy pastures and at the borders of woodland along the streams and found in the groves and thickets across the slopes below the heavy forest on the Hacienda Santa María. At this period of the year they were in flocks of half a dozen to ten or more birds that remained in fairly close company. In the lowland area about Liberia, where there is a fairly uniform covering of brush, their interesting flock behavior was hidden and obscure, but at Santa María, where the thickets and groves were isolated by broad areas of pasture, this was easily evident. Each band had its definite range, and I could count each day on finding the groups in certain circumscribed localities.

While these birds resemble magpies in form because of the long, graduated tail, they are definitely jays in action. It was regular habit for them to fly out of the upper branches of low trees, swing down in a long curve that carried them just above the ground, and then, with a flash of white from the partly spread tail, rise to a perch behind cover in another tree. In the new location it was sometimes difficult to obtain another glimpse of them as often they hopped and flew farther away behind cover. At other times, particularly when near traveled trails, they were tame and confiding, resting motionless among leaves only a few feet distant where I could admire their pleasing shades of light blue, white, and black, the recurved plumes of the jaunty crest, and the long graduated tail that was held at varying angles according to the mood or the movements of the bird. As I called to them among the oak groves of the highlands they often came flying overhead with jaylike scolding notes, sometimes two or three perching near together, almost touching wings, to peer down in search of the source of the sound that intrigued them. As their interest increased they uttered whistled calls and croaking sounds and moved about alertly. Near Liberia a small boa moving through the grass called down a flock with much uproar into branches near the ground, and they were often vociferous at other disturbances.

The six taken were secured near Liberia on October 21 and at the Hacienda Santa María on November 11.

From the material in the National Museum the four races that have been described seem evident on basis of color. The size differences alleged are not apparent, though this may be due to the fact that a number of the specimens at hand are of unknown sex. Following is a brief summary of the forms:

Calocitta formosa formosa (Swainson):

Pica formosa SWAINSON, Phil. Mag., new ser., vol. 1, June 1827, p. 437 (Temascáltepec, México, México).

Duller, more grayish blue above, with more or less black below the eye and on the malar region.

Colima and Puebla to eastern Oaxaca (Tehuantepec and Juchitan), México.

Calocitta formosa azurea Nelson:

Calocitta formosa azurea NELSON, Auk, 1897, p. 55 (Huehuetan, Chiapas, México).

Darkest of all the races, being darker, brighter blue above, with the sides of the head white, except for the dark auricular spot.

From extreme eastern Oaxaca (Tapaná) and Chiapas, across the Pacific slope of Guatemala.

One bird from Tapaná in eastern Oaxaca, near the border of Chiapas, is intermediate, having the side of the head as in *azurea*, but being only slightly darker above than *formosa*.

Calocitta formosa impudens van Rossem:

Calocitta formosa impudens VAN ROSSEM, Proc. Biol. Soc. Washington, vol. 54, Dec. 8, 1941, p. 172 (Pine Peaks, Volcán de Conchagua, El Salvador).

Decidedly paler, grayer above, but brighter blue than *formosa*; the sides of the head white as in *azurea*, but decidedly lighter blue above.

El Salvador, north into the arid valleys of the Caribbean slope in Guatemala.

Calocitta formosa pompata Bangs:

Calocitta formosa pompata BANGS, Proc. New England Zoöl. Club, vol. 4, Mar. 13, 1914, p. 102 (Bolsón, Guanacaste, Costa Rica).

Somewhat darker above than *impudens*, but decidedly lighter than *azurea*, with the sides of the head as in the latter form.

Western Nicaragua and Guanacaste, Costa Rica.

A specimen from Chinandega in northwestern Nicaragua is somewhat intermediate but is nearer *pompata* than *impudens*. I have not seen specimens from Honduras and am uncertain as to whether they are *impudens* or *pompata*.

Family TROGLODYTIDAE

HELEODYTES RUFINUCHA CAPISTRATA (Lesson)

Picolaptes capistrata LESSON, Rev. Zool., vol. 5, 1842, p. 174 (Realejo, Nicaragua).

In the region about Liberia these wrens were common, this being one of the species that I encountered daily in the field. They range in small bands, sometimes near the ground in undergrowth, and again high in the trees. They are alert and active and come to attention through their movements and through their croaking calls. The nests are domed structures as large as a football, made of sticks, and placed near the end of a branch. Though this was not the nesting season they were adding sticks to them, so that I supposed they were using them as sleeping quarters. Inland I observed their nests

from the trail above Las Delicias but did not find them at the Hacienda Santa María.

THRYOPHILUS MODESTUS MODESTUS (Cabanis)

Thryothorus modestus CABANIS, Journ. für Orn., 1860 (May 30, 1861), p. 409 (San José, Costa Rica).

On November 15 I collected three of these interesting wrens at the Hacienda Santa María, an adult female and two immature birds, all in rather ragged condition due to partial molt. They ranged in tangled growth in the thickets and groves scattered through the pastures below the house and did not enter the forest. The chattering note is suggestive of that of *Thryophilus pleurostictus ravus* that I found common at Liberia. The song also is similar, but was not so loud or so clear in tone.

THRYOPHILUS PLEUROSTICTUS RAVUS Ridgway

Thryophilus pleurostictus ravus RIDGWAY, Proc. Biol. Soc. Washington, vol. 16, Nov. 30, 1903, p. 167 (San Juan del Sur, Nicaragua).

This wren, like others of its kind called the *salta espinuela*, was common in the vicinity of Liberia in thickets or in undergrowth along the trails in heavy woodland. The song, heard frequently, is clear and musical, suggestive of that of related species. The call note is a chipping sound that to ears attuned to northern bird calls suggests a warbler or a sparrow rather than a wren. The birds at this season were in partial or complete molt. Specimens were secured on October 19, 24, and 25 and November 18.

In the color of the dorsal surface this series is uniformly duller, less reddish brown than birds from western Nicaragua, including specimens from the type locality. Apparently the difference is due to their condition of fresh, newly grown feathering, since San Juan del Sur, the type locality in Nicaragua, is not far away.

THRYOPHILUS THORACICUS (Salvin)

Thryothorus thoracicus SALVIN, Proc. Zool. Soc. London, 1864 (Feb. 1865), p. 580 (Tucurrique, Costa Rica).

These wrens were found about deadfalls in heavy forest, mainly in the region of Los Cuadros on the Hacienda Santa María. Their clear songs were heard frequently, but the birds were secretive and because of their dull colors were difficult to see in the dim light of these woodlands. One was shot on November 6.

Hellmayr¹⁵ includes *Thryophilus leucopogon* of Salvadori and Festa as a geographic race of *thoracicus* on the basis that the juvenile *thoracicus* has only indistinct streaking on the lower surface. In view of the distinctness of the color pattern of the adults, *thoracicus* being

¹⁵ Publ. Field Mus. Nat. Hist., zool. ser., vol. 13, pt. 7, Nov. 15, 1934, pp. 175-176.

heavily streaked on the breast and sides while *leucopogon* is plain brown, it appears that this contention is doubtful and that it must have other support before it can be accepted.

TROGLODYTES MUSCULUS INTERMEDIUS Cabanis

Troglodytes intermedius CABANIS, Journ. für Orn., 1860, p. 407 (San José, Costa Rica).

The house wren was not common in the area worked at this season. On November 4 I heard one singing in early morning in the town of Liberia. At the Hacienda Santa María a male lived secretly around the house throughout my stay, taking care to keep out of reach of the collecting gun and finally, on the morning of my departure, coming out to chatter familiarly at me as I mounted my mule for the ride down to the lowlands.

HENICORHINA LEUCOSTICTA TROPAEA Bangs and Peters

Henicorhina leucosticta tropaea BANGS and PETERS, Bull. Mus. Comp. Zool., vol. 67, Jan. 1927, p. 480 (La Vijagua, Costa Rica).

The wood wren was a common species in the heavy forests on the Hacienda Santa María, and between November 5 and 14 I secured ten skins. The birds were recorded regularly in the dense woodland at Los Cuadros and were commoner on the higher slopes of the mountain, especially on the wooded plateau called Papal, immediately above the house. They were found in pairs about the numerous deadfalls, where they skulked and chattered in the manner common to wrens. On occasion I heard them giving clear ringing songs. It was not at all difficult to call them out into sight as they had much curiosity about strange sounds.

The series taken is quite uniform in its agreement with the characters of this race.

Family **TURDIDAE**

TURDUS PLEBEJUS PLEBEJUS Cabanis

Turdus plebejus CABANIS, Journ. für Orn., Sept. 1860 (Jan. 1861), p. 323 (Costa Rica).

On the Hacienda Santa María these dark-colored robins were fairly common in the heavy forest on the mountain slope back of the house. Sometimes I heard their calls, a robinlike *pup pup pup*, and occasionally I saw one fly. On one occasion half a dozen feeding in scattered company on the forest floor flushed and went into the tree tops where they remained hidden and motionless until alarmed by a shot. They were so shy that it was difficult to judge accurately their abundance. I took specimens on November 5 and 10, and on November 14 I saw one at the top of the mountain. In another place¹⁶ I have expressed

¹⁶ Proc. U. S. Nat. Mus., vol. 89, Mar. 26, 1941, p. 564.

the opinion that *plebejus* should be considered a species distinct from *ignobilis* of South America until there is evidence of closer connection.

HYLOCICHLA USTULATA SWAINSONI (Tschudi): Eastern Olive-backed Thrush

Turdus Swainsoni TSCHUDI, Fauna Peruana, Aves, 1845, p. 28 (Carleton House, lat. 53° N., on the banks of the Saskatchewan River).

On November 12 I shot an immature male, evidently a bird in southward migration, at the edge of a stand of forest above the house at Hacienda Santa María.

CATHARUS MEXICANUS FUMOSUS Ridgway

Catharus fumosus RIDGWAY, Proc. U. S. Nat. Mus., vol. 10, Aug. 6, 1888, p. 505 (Costa Rica).

In the heavy forest near the Hacienda Santa María these small thrushes were fairly common but were so difficult to see that usually I had barely a glimpse of them. They ranged near or on the ground in dense shadows and ordinarily managed to slip away when barely seen. On November 11 I secured one on the mountain slope back of the house. They are thrushlike in action but impressed me as somewhat different from *Hylocichla*.

The type specimen of this race was taken by Zeledón and has no locality other than Costa Rica. It is probable that it came from one of the mountains near San José.

Family SYLVIIDAE

POLIOPTILA PLUMBEA BAIRDI Ridgway

Polioptila bairdi RIDGWAY, Proc. Biol. Soc. Washington, vol. 16, Sept. 30, 1903, p. 110 (San Juan del Sur, Nicaragua).

In brushy areas near Liberia I collected four males and one female on October 31 and November 2 and 3 and saw a few others. Their mannerisms were typical of gnatcatchers as a group, all being jaunty little birds that often are overlooked because of their small size.

The four males from Liberia all show the white line in the lores which, as van Rossem¹⁷ has found, marks the winter plumage. This white loreal line I have observed also in *Polioptila plumbea plumbiceps* Lawrence that I took at the same season of the year at Ocumare de la Costa in northern Venezuela,¹⁸ but at the time I did not recognize that it was a seasonal character and that in the breeding season the lores were black. Hellmayr's conclusion that these gnatcatchers are all geographic races of *Polioptila plumbea* seems reasonable.

¹⁷ Auk, 1931, pp. 34-36, figs. 4, 5.

¹⁸ Proc. U. S. Nat. Mus., vol. 87, 1939, p. 242.

RAMPHOCAENUS RUFIVENTRIS RUFIVENTRIS (Bonaparte)

Scolopacinus rufiventris BONAPARTE, Proc. Zool. Soc. London, 1837 (June 14, 1838), p. 119 (San José de Guatemala, Guatemala).

In a thicket near the river below Liberia on November 18 I heard trilled, chattering notes, and after watching for several minutes finally collected a male of this bird.

Family VIREONIDAE

VIREO FLAVIFRONS Vieillot: Yellow-throated Vireo

Vireo flavifrons VIEILLOT, Histoire naturelle des oiseaux de l'Amérique septentrionale, vol. 1, 1807 (1808), p. 85, pl. 54 (eastern United States).

Near Liberia I noted two on October 25 in woodland along the river and collected an adult male. November 17 I shot another adult male on the Río Colorado. November 10 I saw one in the shade trees over the coffee at Hacienda Santa María.

VIREO FLAVOVIRIDIS FLAVOVIRIDIS (Cassin)

Vireosylva flavoviridis CASSIN, Proc. Acad. Nat. Sci. Philadelphia, vol. 5, 1851, p. 152 (Panamá and San Juan de Nicaragua, Nicaragua).

The only one of these vireos recorded was a male taken in brush near the Río Colorado north of Liberia on October 23, 1940. This bird had the iris dull hair brown. The specimen has the brighter color marking the typical subspecies. The supposed southern race *insulanus* in my opinion is not separable. Further, I consider this group as specifically distinct from *Vireo olivaceus*.

VIREO PHILADELPHICUS (Cassin): Philadelphia Vireo

Vireosylva philadelphia CASSIN, Proc. Acad. Nat. Sci. Philadelphia, vol. 5, June 30, 1851, p. 153, pl. 10, fig. 2 (Philadelphia, Pa.).

At the Hacienda Santa María on November 14 I shot two from a scattered flock of small birds moving through the shade trees in the coffee plantation above the house. On the Río Colorado near Liberia on November 17 I collected another from a small flock all apparently of this species. All three specimens are females, two adult and one immature. It is always interesting to see the Philadelphia vireo, and I found it doubly so here in its southern wintering range.

HYLOPHILUS OCHRACEICEPS OCHRACEICEPS P. L. Sclater

Hylophilus ochraceiceps P. L. SCLATER, Proc. Zool. Soc. London, 1859 (Feb. 1860), p. 375 (Playa Vicente, Oaxaca).

An adult male and an immature female of this vireo were taken on November 8, 1940, from a flock of little forest birds in the lower levels of the trees at Los Cuadros on Hacienda Santa María. On the three occasions on which I have seen this bird in life in Guatemala, in Veracruz, and here, I have each time taken a pair, these being the only

two seen, which suggests that this is another species in which male and female remain associated throughout the year.

While these are listed as the typical form they appear definitely paler than specimens from Veracruz. With more material I believe that the southern race named *pallidipectus* by Ridgway will prove separable.

HYLOPHILUS DECURTATUS DECURTATUS (Bonaparte)

Sylvicola decurtata BONAPARTE, Proc. Zool. Soc. London, 1837 (June 1838), p. 118 (Guatemala).

On November 6 and again on November 8 in the section called Los Cuadros on the Hacienda Santa María I shot one of these little vireos from a chattering flock in the tops of the lower forest trees. One was seen on November 10.

The two taken are definitely duller than specimens of this species from near Liberia and agree with those from eastern Costa Rica to Guatemala. They were secured at the head of the Caribbean drainage on the mountain, and are another indication of the Caribbean influence on the avifauna of this region.

It may be noted that Griscom¹⁹ has recorded this race from north-western Costa Rica.

HYLOPHILUS DECURTATUS PALLIDUS (Dickey and van Rossem)

Pachysylvia decurtata pallida DICKEY and VAN ROSSEM, Proc. Biol. Soc. Washington, vol. 40, Jan. 8, 1927, p. 4 (Puerto del Triunfo, Departamento Usulután, El Salvador).

Near Liberia I found these vireos in small flocks in woodland along the Río Liberia and the Río Colorado and in the larger groves through the pastureland to the south of town. Specimens were taken on October 26 and 31 and November 1 and 2.

The eight birds obtained are definitely brighter, more yellowish green above, lighter gray on the crown, lighter more yellowish green on the sides and under tail coverts, and whiter on the breast and fore-neck than specimens from eastern Costa Rica to Guatemala, in which they agree with *pallidus* described originally from El Salvador, and known later from western Nicaragua. They represent an extension of range for this bird. Further material should be obtained to determine whether *pallidus* ranges farther to the south in the Nicoya Peninsula. Two birds collected by Ridgway at Pigres near the mouth of the Río Grande de Tárcoles, on the Gulf of Nicoya south of Punta-arenas, belong with typical *decurtatus*, though showing some influence of the darker headed *pusillus* of western Panamá.

The races of this species are to be recognized on color and not on size. It may be noted that *Hylophilus minor*, and its race *dariensis* of eastern Panamá, are specifically distinct and are not races of

¹⁹ Bull. Amer. Mus. Nat. Hist., vol. 64, 1932 p. 320.

decurtatus as listed by Hellmayr²⁰ for they have the crown green, while in *decurtatus* it is gray. In the National Museum there is one skin of the green-crowned *H. m. darienensis* from Gatún, a locality where the gray-crowned *H. d. pusillus* is common.

Family COMPSOTHTYPIDAE

MNIOTILTA VARIA (Linnaeus): Black and White Warbler

Motacilla varia LINNAEUS, Systema naturae, ed. 12, vol. 1, 1766, p. 333 (Hispaniola).

In the coffee plantation near the house at Hacienda Santa María I shot one on November 12 and saw another on November 14.

VERMIVORA PEREGRINA (Wilson): Tennessee Warbler

Sylvia peregrina WILSON, American ornithology, vol. 3, 1811, p. 83, pl. 25, fig. 2 (banks of the Cumberland River in Tennessee).

Near Liberia this bird was common both in forests and in brush-grown pastures. Four specimens were taken on October 25 and 30 and November 2 and 18. They were often found in little groups in bushes near the ground at the border of pasture lands.

DENDROICA PETECHIA AESTIVA (Gmelin): Eastern Yellow Warbler

Motacilla aestiva GMELIN, Systema naturae, vol. 1, pt. 2, 1789, p. 996 (Canada).

Yellow warblers were common around Liberia, five specimens being taken on October 20, 22, 23, and 25. All these are the typical form. I saw several on November 18, but as none were taken I have no check on the subspecies present at that date. Several forms should occur in this region.

DENDROICA PENNSYLVANICA (Linnaeus): Chestnut-sided Warbler

Motacilla pensylvanica LINNAEUS, Systema naturae, ed. 12, vol. 1, 1766, p. 333 (Philadelphia, Pa.).

On November 8 I shot an immature female from a treetop at the edge of heavy forest near the Hacienda Santa María.

SEIURUS AUROCAPILLUS (Linnaeus): Ovenbird

Motacilla aurocapilla LINNAEUS, Systema naturae, ed. 12, vol. 1, 1766, p. 334 (at sea, about 30 miles off Hispaniola).

At the Hacienda Santa María on November 5 I saw two and shot an immature male. Another secured on November 12 was prepared by Aguilar for the Museo Nacional in San José.

OPORORNIS FORMOSUS (Wilson): Kentucky Warbler

Sylvia formosa WILSON, American ornithology, vol. 3, 1811, p. 85, pl. 25, fig. 3 (Kentucky).

²⁰ Publ. Field Mus. Nat. Hist., zool. ser., vol. 13, pt. 8, 1935, p. 185.

On November 6 I shot an adult female near the ground in heavy forest at Los Cuadros on the Hacienda Santa María.

CHAMAETHLYPIS POLIOCEPHALA ICTEROTIS (Ridgway)

Geothlypis caninucha icterotis RIDGWAY, Proc. U. S. Nat. Mus., vol. 11, Sept. 20, 1889, p. 539 (Costa Rica).

Near Liberia I shot two of these ground-chats on October 26 and November 18 in brush-grown fields where there was much high grass. At the Hacienda Santa María I found them in grass and weeds bordering thickets on the rolling slopes below the house. Specimens were taken here on November 7 and 15. The birds were completing the molt at this time and were secretive and hard to find.

Review of available material leaves no doubt in my mind that *icterotis* is a valid form and one to be recognized. In breeding dress it is distinctly different from *C. p. caninucha* in being duller green above, and paler yellow with the yellow more extensive. The flanks are lighter brown. In fresh fall plumage it is definitely browner above. It is similar to *C. p. palpebralis* in extent of yellow below but has the flanks deeper brown and the dorsal surface greener.

From available material it appears that the following races of this species should be recognized:

Chamaethlypis poliocephala ralphi (Ridgway):

Geothlypis poliocephala ralphi RIDGWAY, Proc. U. S. Nat. Mus., vol. 16, Feb. 5, 1894, p. 692 (Brownsville, Tex.).

The palest of all the races; compared with *C. p. poliocephala* sides and flanks lighter brown, yellow of breast paler, and abdomen much whiter.

Lower Rio Grande Valley in Texas south into northeastern México.

The present extent of the range of this species in México is uncertain. A good series at hand from Brownsville leaves no question as to its validity as a distinct form, though currently it has been placed in the synonymy of *poliocephala*.

Chamaethlypis poliocephala poliocephala (Baird):

Geothlypis poliocephala BAIRD, Review of American birds, Apr. 1865, pp. 220, 225 (Mazatlán, Sinaloa).

Compared with *ralphi* breast and foreneck deeper yellow, the color more extensive; flanks and sides darker brown.

Northern and central México, from Sinaloa to Morelos and Michoacán.

Brodkorb has separated birds from Morelos and Michoacán under the name *pontilis*²¹ on the basis of supposed larger size. The few

²¹ *Chamaethlypis poliocephala pontilis* Brodkorb, Journ. Washington Acad. Sci., vol. 33, Feb. 15, 1943, p. 33 (Puente de Ixtla, Morelos).

specimens that I have seen make it desirable to check this with more material.

Chamaethlypis poliocephala palpebralis (Ridgway):

Geothlypis (*Chamaethlypis*) *palpebralis* RIDGWAY, Manual of North American birds, 1887, pp. 526, 592 (Mirador, Veracruz).

Yellow of lower surface deeper and more extended distally than in *poliocephala*.

Central Veracruz through northern Chiapas to eastern Guatemala.

While the birds found in Campeche and Yucatán are assigned to this race, the few specimens that I have seen have the yellow below as extensive as in *caninucha*, though above they are paler greenish like *palpebralis*. They probably represent a distinct form, a matter to be decided with more material.

Chamaethlypis poliocephala caninucha (Ridgway):

Geothlypis poliocephala var. *caninucha* RIDGWAY, Amer. Journ. Sci. Arts, Dec. 1872, p. 459 (Retalhuleu, Guatemala).

Similar to *palpebralis* but brighter green above; yellow on lower surface more extensive, covering the abdomen.

Southern Chiapas through western Guatemala, Honduras, and eastern Nicaragua.

The lack of white on the eyelids alleged in early writings as a character in this form is not stable, as white is present in some specimens, though usually in reduced amount where found.

This form may range to extreme northeastern Costa Rica.

Chamaethlypis poliocephala icterotis (Ridgway):

Geothlypis caninucha icterotis RIDGWAY, Proc. U. S. Nat. Mus., vol. 11, Sept. 20, 1889, p. 539 (Costa Rica).

Similar to *caninucha* but somewhat duller above; yellow below a little paler, somewhat less extensive; flanks lighter brown; fall plumage definitely browner above.

Western Nicaragua to central Costa Rica.

In this race the yellow below is about as extensive as in *palpebralis*. It is distinguished from that race by having the dorsal surface brighter green, and the flanks darker brown. We have one specimen from Managua, Nicaragua, that belongs here.

Chamaethlypis poliocephala ridgwayi Griscom:

Chamaethlypis poliocephala ridgwayi GRISCOM, Proc. New England Zool. Club, vol. 12, Apr. 3, 1930, p. 7 (Boruca, Costa Rica).

Similar to *caninucha* but deeper yellow below; greener above; slightly smaller in size.

Southwestern Costa Rica (Térraba Valley) and western Panamá (Boquete, Volcán de Chiriquí).

WILSONIA PUSILLA PILEOLATA (Pallas): Northern Pileolated Warbler

Motacilla pileolata PALLAS, Zoographia Rosso-Asiatica, vol. 1, 1811, p. 497 (Kodiak Island, Alaska).

On November 9 I shot a male of this race in the coffee plantation near the house at the Hacienda Santa María. Other warblers of this group were seen at Puerto Limón on October 12 and at San José on October 15. Subspecific identity for these sight records is uncertain.

MYIOBORUS MINIATUS COMPTUS, new subspecies

Characters.—Similar to *Myioborus miniatus aurantiacus* (Baird)²² but definitely darker, more orange on breast and abdomen; chestnut crown patch slightly darker.

Description.—Type, U. S. N. M. No. 361729, male, from 900 meters elevation on Cerro Santa María, a spur of Volcán Rincón de la Vieja, above the Hacienda Santa María, taken November 14, 1940, by Alexander Wetmore, original No. 10958.

Central crown patch bay; crown otherwise dull black; hindneck, back, scapulars, wing coverts, tertials, and rump dark neutral gray; primaries and secondaries dull black, the latter edged with dark neutral gray; upper tail coverts black; tail black with white tips on outer feathers, broad on first two, reduced on third, and disappearing on fourth and fifth; sides of head and side of breast dark neutral gray; throat and upper breast dull black with a wash of dusky neutral gray; center of breast ochraceous-orange becoming cadmium orange on lower breast, sides and abdomen; under tail coverts white; outer under wing coverts deep neutral gray, others white. Bill black; tarsus and toes brownish black (from dried skin).

Measurements.—Males (8 specimens), wing 61.8–65.9 (63.7), tail 55.6–60.4 (58.8), culmen from base 11.7–12.7 (12.2), tarsus²³ 17.9–19.5 (18.7) mm.

Females (4 specimens), wing 56.3–63.6 (59.1), tail 50.0–58.8 (54.4), culmen from base²⁴ 11.6–12.2 (12.0), tarsus 17.4–18.4 (17.9) mm.

Range.—Mountains of northern Costa Rica including the Cordillera Central and the Cordillera de Guanacaste (specimens examined from Volcán Rincón de la Vieja, Tenorio, Barranca, Coliblanco, Grecia, Cartago, and Guayabo).

Remarks.—When Outram Bangs described *acceptus*²⁵ as the race of *Myioborus* from western Panamá he compared it with what he supposed were specimens of Baird's *aurantiacus* from Costa Rica, noting that his birds from Chiriquí were yellower, less orange below. In studying the skins that I secured in the mountains of Guanacaste it was at once evident that there are two races of this species in Costa

²² *Setophaga aurantiaca* Baird, Review of American birds, May 1865, p. 261 (Dota, Costa Rica).

²³ Seven specimens.

²⁴ Three specimens.

²⁵ *Myioborus aurantiacus acceptus* Bangs, Proc. New England Zool. Club, vol. 4, Mar. 19, 1908, p. 30 (Boquete, 4,000 feet elevation, Volcán de Chiriquí).

Rica. From the mountains included in the Cordillera de Talamanca in the southern half of the country down into western Panamá the birds are distinctly paler, more yellow below. Baird's type of *aurantiacus* from Dota, and a series secured by Zeledón and Ridgway from Santa María de Dota, Lagunaria and Copey, are of this lighter yellow group. Specimens from Chiriquí are identical with them, and so *acceptus* of Bangs becomes a synonym of *aurantiacus*.

To the north of the depression through which the railroad line crosses through Siquirres on the route from Puerto Limón to San José, and from there descends toward Puntarenas on the west coast, through the mountains of the Cordillera Central and the Cordillera de Guanacaste, these warblers are darker, more orange below. J. L. Peters writes me that Bangs apparently had available skins from Tenorio and Cerro Santa María when he described *acceptus*, so that actually he was comparing his birds from Chiriquí with the form that I have here named *comptus*. Specimens from above Cartago and Grecia are somewhat intermediate, but are nearer *comptus*.

These warblers were found in the heavy forest of the Cerro Santa María above the Hacienda ranging from about 900 meters elevation to the summit. They were seen in the lower branches of the trees, or in the undergrowth near the forest floor, and were rather shy. The two taken I shot on November 10 and 14.

BASILEUTERUS CULICIVORUS CULICIVORUS (Lichtenstein)

Sylvia culicivora LICHTENSTEIN, Preis-Verzeichniss Säugethiere, Vögel . . . in Mexico, 1830, p. 2 (Jalapa, Veracruz).

At the Hacienda Santa María these warblers were fairly common in heavy forest. I took specimens on November 5, 7, 8, and 9, finding the birds usually in dense cover among the lower branches of the trees, where they moved actively and scolded at me.

The five skins agree with examples from Guatemala to southern México, as do three others in the National Museum from Guanacaste, the latter having been taken by C. F. Underwood at Tenorio on January 28 and February 7 and 10, 1910. As other writers have noted, specimens from northern and central Costa Rica are intermediate between *culicivorus* and *godmani*, being placed with the latter. Two skins from Guayabo are identical with specimens from Chiriquí, being decidedly more yellow green above than a series from farther west.

BASILEUTERUS DELATRII DELATRII Bonaparte

Basileuterus delatrii BONAPARTE, Compt. Rend. Acad. Sci. Paris, vol. 38, 1854, p. 383 (Nicaragua).

October 25 while following the Río Liberia above the town of Liberia I secured three of these active warblers in tangled growth near

the ground. Later, on November 12, on the Hacienda Santa María I found them common in the woodlands and thickets scattered through the pastures below the house. Their chipping calls brought them to attention in the fairly dense growths near the ground that were their haunt.

While the race *mesochrysus* is recorded from southwestern Costa Rica the series represents the typical race.

Family ICTERIDAE

ICTERUS GALBULA (Linnaeus): Baltimore Oriole

Coracias Galbula LINNAEUS, *Systema naturae*, ed. 10, vol. 1, 1758, p. 108 (Virginia).

The four specimens taken include two males and two females from Liberia, October 26, and from Hacienda Santa María, November 10 and 14. The birds were common from the day of my arrival, and at Liberia they were seen frequently in the town. Numbers came at sunset from the adjacent country to roost in the village trees where they mingled with *Icterus sclateri sclateri*. October 29 I observed at least 50 of the two species flying singly or in groups past the hotel. On the mountain I found them in orange trees near the Hacienda house where they were eating the fruit opened by woodpeckers. At Liberia they were present on November 18 on my last day afield.

ICTERUS BULLOCKII (Swainson): Bullock's Oriole

Xanthornus Bullockii SWAINSON, *Phil. Mag.*, new ser., vol. 1, June 1827, p. 436 (Real del Monte, Hidalgo, Mexico).

A female taken at Liberia on November 1, 1940, has the abdomen more yellowish than the average of *bullockii* but otherwise exhibits the coloration of that bird, except that two scapular feathers on the left side have the outer webs dark at the centers as is regularly the case in *Icterus galbula*. The specimen measures as follows: Wing 87.3, tail 66.3, culmen from base 19.7, tarsus 13.3 mm. It is the farthest south at which this bird has been recorded as far as I am aware.

The slightly abnormal markings described are of interest in connection with the account by Sutton²⁶ of orioles from western Oklahoma that display markings variously intermediate between the Baltimore and Bullock's oriole.

ICTERUS SCLATERI SCLATERI Cassin

Icterus Sclateri CASSIN, *Proc. Acad. Nat. Sci. Philadelphia*, Apr. 1867, p. 49 (Nicaragua).

These beautiful orioles were found in the wooded areas along the Río Liberia, where I shot males on October 26, 28, and 29. The Baltimore oriole ranges with them at this season, the two having similar habits.

²⁶ Auk, 1938, pp. 1-6, pl. 1.